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Macroeconomic policy interaction: State dependency and implications for financial stability in UK: A systemic review

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Abstract: The association between economic and financial stabilities and influence of macroeconomic policies on the financial sector creates scope of active policy role in financial stability. As a contribution to the existing body of knowledge, this study has analysed the implications of macroeconomic policy interaction/coordination for financial stability, proxied by financial assets, i.e. equity and bonds price oscillation. The critical review and analysis of the existing literature on the subject suggests that there is also ample evidence of interdependence between monetary and fiscal policies and this interrelation necessitates coordination between them for the sake of financial stability. There is also a case for analysing the symmetry of financial markets responses to macroeconomic policy interaction. On methodological and empirical grounds, it is vital to test the robustness of policy recommendations to overcome the limitation of a single empirical approach (Jeffrey–Lindley's paradox). Hence, the Frequentist and Bayesian approaches should be used in commentary manner. The policy interaction and optimal policy combination should also be analysed in the context of institutional design and major financial events to gain insight into the implications of policy interaction in the periods of stable economic and financial environments as well as period of financial and economic distress.

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PUBLIC INTEREST STATEMENT

The stability of the financial sector is very important for both the economy and society. This importance creates scope of active policy role in financial stability. However, relying on a single policy measure is not the best scheme to achieve neither economic nor financial stability. This study has analysed the implications of macroeconomic policy coordination for financial stability and is particularly focused on stock and bond markets. The critical review and analysis of the existing literature on the subject suggest that there is also ample evidence of interdependence between monetary and fiscal policies and this interrelation necessitates coordination between them for the sake of financial stability. There is also a case for analysing the symmetry of financial markets' responses to macroeconomic policy interaction. This study also suggests that it is vital to test the robustness of policy recommendations using alternative empirical approaches. Furthermore, the institutional design and major financial events are important factors in coordination of policies.

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Subjects: Banking; Investment & Securities; Macroeconomics; Monetary Economics

Keywords: macroeconomic policy interaction/coordination; symmetry of financial markets responses; financial stability; Bayesian estimation; Jeffrey–Lindley's paradox; institutional design

JEL Classifications: C11; E02; E44; E52; E58; E61; E63; G12; G18

1. Introduction/background and contemporary research issues' role of economic policies

Fiscal and monetary policies are the most prominent and widely used macroeconomic policies in addressing many economic issues by policy-makers. The basic function of macroeconomic policy is to contribute towards the achievement of economic objectives, e.g. price stability and economic growth (Bank of England, 1997). Hence, as defined by the US Federal Reserve (2011), monetary policy is referred to the actions taken by monetary authority (Central Bank) to control the availability and cost of monetary instruments for national economic goals. Correspondingly, fiscal policy can be described as government's policies of, e.g., revenue collection and spending to accomplish its financial obligations. Particular to the UK economy, Her Majesty's Treasury (HMT) is responsible for the formulation and implementation of fiscal policy, whereas monetary policy is autonomously formulated by the Bank of England (hereafter BoE; official abbreviation[1]). The stance of a macroeconomic policy can be either categorized as contractionary or expansionary, depending upon its effects on the supply of money in the economy. Macroeconomic policy which leads to the expansion of money supply, for instance, through tax or interest rate cuts would be called expansionary macroeconomic policy and vice versa (Sullivan & Sheffrin, 2003).

The effects of macroeconomic policies are not limited to the real economy[2] as various studies, for instance Bredin, Hyde, and Reilly (2005), Ardagna (2009) and Arnold and Vrugt (2010), reported significant impacts of macroeconomic policies on the financial sector. In practise, the responses of stock and bond markets to monetary policy are acknowledged by the Bank of England (2011), stating that bonds and equities are inversely related to interest rates due to the high rates on which future income is discounted.

1.1. State dependency

The associations between macroeconomic policies, the real economy as well as the financial sector are not consistent and have shown some dynamics with respect to the state of the economy. Putting it simply, the impact of a macroeconomic policy may vary under different circumstances. In support of this, Lippi and Trachter (2012) and Chen (2012) showed that monetary policy effects on output and US stock market vary according to the state of economy. It implies that the scope of monetary or fiscal policy for achievement of any objective could be influenced by other factors, often prevailing macroeconomic conditions. This dynamic behaviour of macroeconomic policy impact is called *State Dependency*. It also raises the question about the implications which business cycles or any other macroeconomic factors could have for effectiveness of a single or both macroeconomic policies.

In addition to business cycles, the impacts of monetary policy could be influenced by the institutional framework for policy-making and major macroeconomic events impacting the economy. The macroeconomic events and or institutional changes in policy frameworks could result in paradigm shifts which in turn influence the impacts of monetary policy (see Kontonikas, MacDonald, & Saggu, 2012; Wong, Khan, & Du, 2006). Similarly, an important aspect of macroeconomic policies is the structure and design of their parental institutions. Any change in the framework of policy-making intuitions could affect the effectiveness of monetary policy (see Lu & In, 2006; Osborn & Sensier, 2009; Semiromi & Reza, 2010). Specific to institutional framework in the UK, some major changes in the past few decades can be noted, particularly the independence of the Bank of England (1997) which resulted in a big shift in institutional design. Certain responsibilities related to financial stability, e.g. banking sector supervision and management of sovereign debt were transferred to the

Financial Services Authority (FSA) and Debt Management Office (DMO). We will have a detailed discussion on intuitional framework in the later sections. However, the point to be made here is that state dependency and institutional design are important aspects to be considered in a study on the subject of macroeconomic policies.

Most studies on this subject have been either focused on the Econometric or General Equilibrium approaches to gauge the impacts of macroeconomic policies on the economy. In this regard, Bhattarai (2011) strongly emphasized that DSGE and Econometric models should be considered complementary techniques rather than competitive. Apart from separate empirical frameworks, we also have separate approaches to estimations in this study, i.e. Traditional or Frequentist approach and Bayesian techniques. These are based on different theorems (Gauss–Markov theorem and Bayes theorem), and both approaches are fundamentally different in various contexts. The Frequentist approach is deterministic in approach, whereas the Bayesian approach is stochastic in nature. Nevertheless, these differences in empirical approaches may show different impacts of macroeconomic policies. In this aspect, Robert (2013) cautioned that each estimation approach may lead to a different conclusion and we could end up with a situation called Jeffreys–Lindley's paradox. Thus, an analysis of the role of macroeconomic policies and resulting policy decisions might be influenced by the choice of empirical approach employed to perform the policy analysis.

1.2. Significance of the financial sector

Despite their influences on the financial sector, it could be legitimately questioned why macroeconomic policies should consider financial market dynamics when financial stability has not been the mandate of macroeconomic policy-makers and institutions so far. Minsky (1974) reported the significance of the financial sector for the real economy quite a while ago, yet the behaviour of financial markets has not been incorporated into macroeconomic policy formulation hitherto. On this issue, by criticizing monetary policy stance in the real world, Mishkin (2011) argued that "although central bankers were aware that the financial sector has an important effect on economic activity, financial frictions were not an element of the pre-crisis monetary policy".[3] Hence, the defence of our intention to consider the financial sector within the macroeconomic policy mix is due to its importance for the real economy. In a recent post-financial crisis study, Borio (2011, p. 33) argued that "financial and macroeconomic stabilities are two sides of the same coin and monetary policy plays a critical role in both". Similarly, Tsouma (2009), Funke, Paetz, and Pytlarczyk (2010) and most recently Airaudo, Cardani, and Lansing (2015) declared that financial market performance itself is important for economic stability. It was also suggested that monetary policy by incorporating stock market prices in its formulation (Taylor type rules) could help reduce economic fluctuations, which could not be done solely focusing on the real economy only.

1.3. Scope of macroeconomic policies in financial stability

The frequent argument in favour of monetary policy role in financial stability documented in previous paragraphs does not imply that there is consensus among academics and economists and policy-makers on this subject. For instance, by rejecting the aspect of monetary policy role in financial stability, Nakov and Thomas (2011) argued that the optimal monetary policy should only be strict inflation targeting. This rejection was also revealed by Albulescu (2011) that monetary policy role in financial stability has not been appreciated by the Austrian school of thought. In a rather recent study, Williams (2012) showed that optimal monetary policy should be able to react to financial crises. Similarly, Blanchard, Dell'Ariccia, and Mauro (2010) argued that in the post-crises scenario, despite the fact that there is no change in ultimate goals of output and inflation stability, asset prices and leverage of agents should also be in the sight of macroeconomic policy makers. Mishkin (2011) argued that as price and output stability do not ensure financial stability, therefore, macroeconomic policy solely based on these objectives may not be enough to produce good economic outcomes. It is therefore unambiguous that there is an important role for macroeconomic policies in financial stability worth serious consideration. This is one of the considerations we are taking in this study.

1.4. Macro-prudential policies

Financial stability[4] and growth have been the remit of macro-prudential policies formulated by different regulatory bodies, for instance, by the FSA in the case of the UK. In addition, there is also an unconventional instrument of asset purchases called Quantitative Easing (Q.E) which has been used by the BoE and could be considered a policy tool for achieving financial stability. Some studies, for instance Benigno, Chen, Otrok, Rebucci, and Young (2013), argued that macro-prudential policies are welfare reducing and should not be used to avoid financial crises. In addition, Agenor and Silva (2012) and Borio (2011) claimed that prudential policies are insufficient for financial stability and urged monetary actions instead. Whereas accepting the limitations of prudential policies, Svensson (2012) and Collard, Dellas, Diba, and Loisel (2012) cautioned that monetary policy (interest rates cut) should only be used as a "Last Line of Defence" in financial crises when prudential polices are insufficient. Their caution also raises concerns as monetary policy can only take us so far due to the limitation of the liquidity trap (zero bound or nominal interest rates cannot be cut further below zero). This limitation was acknowledged by Mishkin (2011) and could be witnessed in the present economic scenario.[5] Cúrdia and Woodford (2011) assert that QEs are not very effective in addressing financial crisis since they depress the returns (yield) on financial assets.

Coupling the macro-prudential policies with monetary policy has been suggested as a solution to financial and economic crises. Angelini, Neri, and Panetta (2010) found that active macro-prudential policies coupled with macroeconomic policies have the potential to reduce economic volatility, though the benefits might be trivial. There is also the risk of failure of policy coordination which could bring adverse outcomes for the economy. Looking at the functioning of macro-prudential policies and macroeconomic policies, macro-prudential policies could be considered preventative, whereas macroeconomic policies work as preventative as well as reactive measures. These features of monetary and fiscal policies (macroeconomic policy) make them stand apart. A recent study on the role of fiscal policy by Benigno, Chen, Otrok, Rebucci, and Young (2012) showed that fiscal policy was an affective pre- as well as post-financial crises policy instrument. Similarly, Mishkin (2011) argued that "Leaning against financial instability is better than cleaning up after the crises". It has been widely acknowledged that the current global financial and economic crises were so severe that they overwhelmed the ability of conventional monetary policy to counteract it. This sentiment also indicates the limitation of monetary policy and potential scope of fiscal policy as a complimentary tool for more effective macroeconomic policy interventions.

1.5. Fiscal–monetary policy combination

In comparison with monetary policy, lesser attention has been paid to analyse the association between fiscal policy and the financial sector (Ardagna, 2009). The phenomenon behind this discrimination against fiscal policy for its potential role in economic and financial stabilities was explained by Blanchard et al. (2010). These authors argued that in the past two decades, fiscal policy took a backseat to monetary policy in the practise of macroeconomic policy implementations. The reason for this seemed to be the wide scepticism about the effects of fiscal policy, largely based on the *Ricardian Equivalence*.[6] Hence, if monetary policy could maintain stable output and price, there was then little reason to use another instrument. A distinctive aspect of this study is the use of macroeconomic policy combinations for financial stability as there is evidence of a consensus emerging in recent studies that considers it preferable to use both policies simultaneously (see Gomis-Porqueras & Peralta-Alva, 2010; Sims, 2011).

The notion of using more than one policy instrument is half a century old due to what is called Tinbergen's Principle. This principle itself is not a policy guideline. Agenor and Silva (2012, p. 6) argued that "Tinbergen's does not assert that any given set of policy responses will, in fact, lead to that solution. To assert this, it is necessary to investigate the stability properties of a dynamic system". In simple words, one policy combination does not fit all and *Tinbergen does not suggest any policy combination either*. Most importantly, in the context of financial (government debt) stability, Hughes Hallett, Libich, and Stehlík (2011, p. 2) argued that "let us note that there will be no additional policy

instrument to achieve the financial stability goal (in the spirit of Tinbergen, 1952) and it is never socially optimal for monetary policy to do the job on its own".

Despite the acknowledged importance of joint policy analysis, most studies in the existing literature have only focused on a single policy. Even the studies which incorporated policy combinations into their analyses mainly focused on the EU and the real economy (see Jansen, Li, Wang, & Yang, 2008; Semmler & Zhang, 2003). A point to note here which is interesting and which will also be relevant in this study is Auerbach and Gorodnichenko (2012) who found heterogeneity in impacts of fiscal policy on different sectors of the economy. In relation to this finding and due to country-wise heterogeneity, Baum, Poplawski-Ribeiro, and Weber (2012) called for a tailored use of fiscal policy and a country-by-country assessment of their effects. Thus, sectoral and country-wise heterogeneity in impacts of monetary and fiscal policies imply that we may have a very unique optimal macroeconomic policy combination for a specific context of the financial sector's stability. Hence, it may not be appropriate to generalize the existing evidence of policy combinations on the real economy to the financial sector's stability everywhere. On top of this, UK financial markets have several unique features which make them stand apart (see Yang, Zhou, & Wang, 2009). In other words, the policy guidelines drawn on the basis of a particular sector of the real economy of any country should not be generalized to the financial sector's stability in the UK, unless and until a comprehensive analysis is performed.

1.6. Indistinct key concepts

It is essential that a few indistinct and elusive yet quite important concepts are defined and explained for the convenience of the reader. First is *Financial Stability* which has no single generally agreed definition, and therefore it is not as explicit as price stability, for example, which could be quantified as 2% inflation target by the BoE. On this same subject, according to Foot (2003) there is "no particular definition of financial stability". However, it could be defined in the context of *financial assets price volatility and generality of financial markets and institutions.* An interesting and rather bold argument was made by Goodhart (2004, p. 2) that "Indeed there is currently no good way to define, nor certainly to give a quantitative measurement of financial stability". Fortunately, the answer to the question about how financial stability could be defined in an appropriate way came out in a recent study by Khorasgani (2010, pp. 20–21). Taking a line, somewhat similar to Foot (2003, p. 3), it was argued that "There is no consensus on a definition of financial instability. However oscillation of some variables is often considered. House and stock prices, exchange rate and the prices of some other financial assets, on the one hand, and household debt growth and debt accumulation, on the other hand, are some of the main variables which are used to investigate the financial imbalances issue." Hence, considering these arguments, our definition of financial stability is simply about the price behaviour of financial assets, i.e. stock (equities) and government bonds.

Now, a legitimate question could be posed about why the *particular segments of the financial market* on which this study is focused are only the *stock and bond markets?* A simple answer and reason for this choice could be to a small extent the limited scope of this research as we are unable to consider all segments of the financial market. However, it is particularly because of the "*wealth effects of stock and bond markets* on the real economy" (see Airaudo et al., 2015; Funke et al., 2010; Malikane & Semmler, 2008). In addition to those authors, Broome and Morley (2004) also found that stock prices are a significant *indicator of financial crises*. Similarly, Campbell (1995) and David Gulley and Sultan (2003) gave a comprehensive account of the importance of bond market for governments as well as for private sector investors. Third and final reason for this choice is our *definition of financial stability*. Following the footsteps of Foot (2003) and Khorasgani (2010), it can be defined as financial assets price oscillation and financial market *generality of financial markets and institutions.*

1.7. Optimality

The second term on which there is some consensus, yet requires some explanation, is our definition of *Optimal Policy*. In this context, we refer to Mishkin's (2011) argument that the theory of optimal

monetary policy starts by specifying an objective function that represents economic welfare, and then maximizes this objective function subject to a set of constraints. The existing evidence on the definitions of *Optimal Policies* shows that various studies use this term in a range of contexts. For instance, Bénassy (2003) declared the optimal combination of monetary and fiscal policies as the one which leads to maximization of household utility and firm profits, whereas Nakov and Thomas (2011) categorized a monetary policy as optimal which curtails inflation.

A fascinating point to note here is that apart from the different contexts in which optimality of a policy has been seen by various studies, it is also interesting to recognize that for the same context, the parameter of optimality has been different. Ferrero (2009) showed that optimal monetary policy should be flexible inflation targeting, while taking an opposite line, Nakov and Thomas (2011) argued that optimal monetary policy should only be strict inflation targeting. Hence, in these two examples, there is a difference of opinion on the optimality of monetary policy for achieving the same objective, i.e. price stability. One reason for this difference could be the constraints which should also be satisfied. In this study, we are analysing the optimality of macroeconomic policies in the context of financial stability. There is very few, yet sufficient evidence to support the importance of analysing optimality of policy combination for financial stability. For example, a recent study by Benigno et al. (2012) showed that optimal fiscal policy (taxes) is effective in restoring financial stability. This study used *capital flows* as the measure of financial stability. However, this study measures financial stability using stock and bond markets. In this regard, this is associated with Kontonikas and Montagnoli (2006) who argued that optimal monetary policy should positively affect stock market and house prices due to the wealth effects of these assets. In other words, this study considers a macroeconomic policy combination as *optimal* which positively influences our objective function, e.g. stock prices without negatively affecting the bond market (constraint) and vice versa. The optimal policy combination for financial stability is to some degree unique as mostly optimal policy has been seen as a single policy in context of the real economy. The difference of this study from any other is to take it further by taking fiscal policy and bond markets on board. Furthermore, this study also tests the optimality of our policy mix in various contexts (discussion on policy combinations and state dependencies in separate section) as a robustness measure.

1.8. Estimation of optimal policy

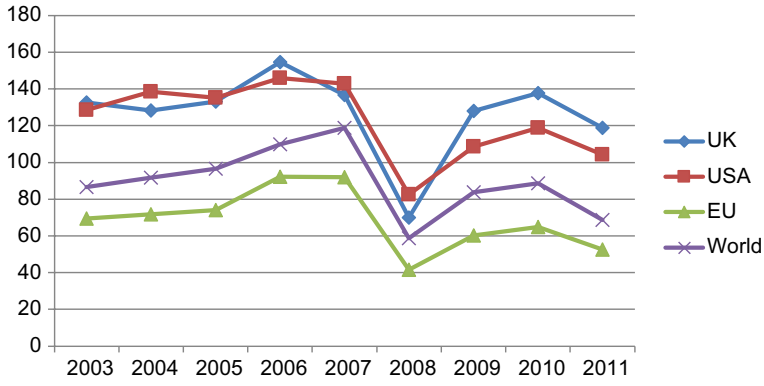
At this point, a methodological question may arise about how this study would measure the impact of optimal macroeconomic policies on financial stability. More specifically, how long the positive effects of macroeconomic policies on stock and bond markets should persist to make a contribution to financial stability? To provide an adequately satisfying answer, this study looks into the theoretical as well as philosophical backgrounds of these questions and the answers appropriate to them. "The stock and bond markets are used as proxies for financial markets and we specifically consider the wealth effects of these markets." In other words, the increase in value of assets leads to increase in wealth of their holders, resulting in increased consumption and economic growth (see Airaudo et al., 2015; Caporale & Soliman, 2013; Case, Quigley, & Shiller, 2012). At this point, it's worth mentioning that Altissimo et al. (2005) comparing various European economies argued that the wealth effects are rather more important for the British economy due to the high degree of financialization than in other European countries. Figure 1 best illustrates their argument, clearly depicting the relatively gigantic size of the British financial sector in comparison to its national income relative to other countries.

The wealth affects are instantaneously created with the increase in value of financial assets. A study by Carroll, Otsuka, and Slacalek (2011) found that the *wealth effects are immediate and persist for several quarters before completely being defused*. Similarly, an earlier study by Carroll (2004) compared various studies and argued that although there is mixed evidence, mostly the *wealth effects* persist into the medium term (3 years).

"The full effect happens asymptotically as time reaches infinity." Despite the fact that the wealth effects are instant, instead of looking at the short term (news effects), this study will consider the

Figure 1. Market capitalization in comparison with national income (% of GDP).

Source: World Bank's World Development Indicators (2013).



long-term behaviour of financial markets in response to macroeconomic policies combinations. The rationale is that a positive response from financial markets which persists over several periods may result in enduring wealth affects.

The philosophical foundation of this study is derived from positivism, which suggests this study will urge on adopting the scientific approach, objective measures and systematic statistical analysis to better understand how an interaction of monetary and fiscal policies could influence financial stability. Hence, this study intends to provide a comprehensive theoretical framework which provides theoretical rationale to include the most appropriate data. Having access to two policies means there could be four possible policy combinations.[7] As explained earlier, a policy combination which maximizes the objective function (*Bliss Point*) while satisfying the constraints would be the most appropriate or *Pareto Optimal*[8] *policy combination*. Putting it more simply, an optimal policy combination would lead to relatively long-lasting positive impacts on stock and bond markets, which also significantly contributes to financial stability through the *wealth effects/real economy* dynamics.

Considering the pragmatic aspect of this study, an insight into the current outlook of the financial sector in the UK is essential. It would shed some light on the scope of macroeconomic policies in the light of theories as well as contemporary macroeconomic and institutional environments in which financial markets exist.

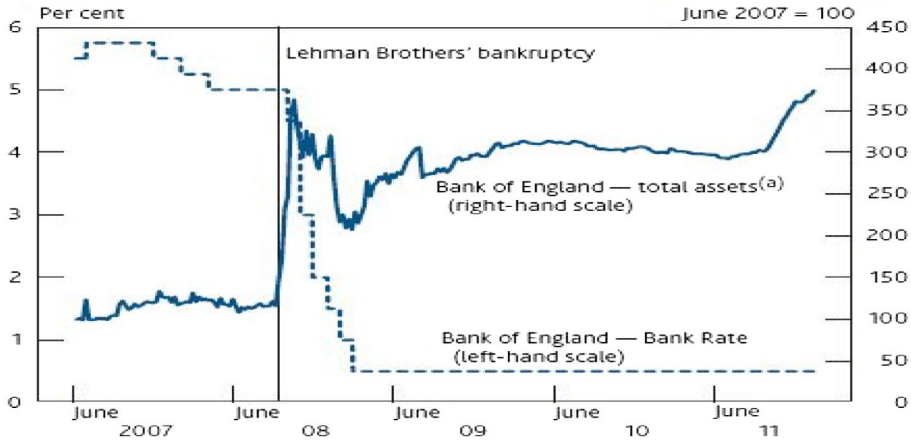
2. Current financial outlook and policy measures

The current state of affairs in the financial sector shows a gloomy picture. Exceptional and to a degree unprecedented events in the last few years, specifically the aftermath of Lehman Brothers collapse, led to both monetary and fiscal authorities to adopt unconventional and aggressive approaches to address the effects of the financial and economic repercussions of the crises. The BoE launched an asset purchase programme referred to as quantitative easing (QE) and the HM Treasury bailed out financial institutions including notably the Royal Bank of Scotland (RBS) and Northern Rock building society. Money was pumped into the financial sector through QE to try to solve the liquidity problems. The BoE introduced the so-called Special Liquidity Scheme*[9] in 2008 to improve the liquidity position in the UK economic system. Similar practices were implemented by other countries like the USA, China and Euro zone countries, etc. However, the focus of this study is on the British economy and its relatively large financial sector. Figure 2 represents the stance of the Bank of England in response to the financial and economic crises and post-Lehman Brother's bankruptcy episode.

It is evident from the diagram that in addition to the very active expansionary stance by dropping interest rates, the BoE has also used the unconventional instrument of Quantitative Easing by purchasing financial assets on a large scale. There is some evidence in the macroeconomic literature on the intensity of the response by the BoE to the crises. Study by Landolfo (2004) showed that among

Figure 2. Bank of England, monetary policy (rates) and balance sheet.

Note: Assets in Billions GBP.
Source: Bank of England Quarterly Bulletin (2012, p. 1).



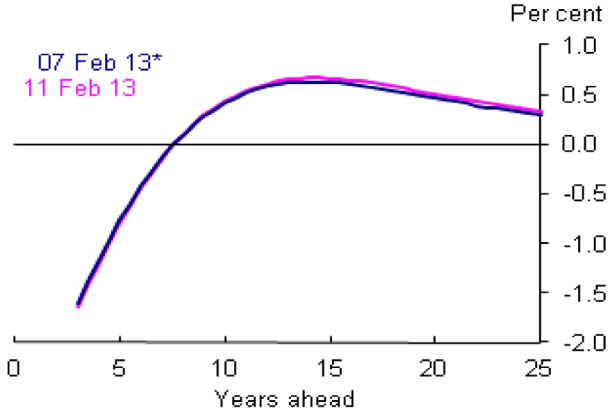
the world major central banks, i.e. the US Fed, European Central Bank (ECB) and the Bank of England (BoE), the latter showed the most aggressive behaviour in response to adverse economic conditions. The current state of affairs represented in the above diagram clearly has two implications. Firstly, it indicates the severity of the financial and economic crises and their implications for the real economy which led the BoE to adopt an additional unconventional instrument of QE. Secondly, it also indicates the limitation of interest rates as an instrument in this particular case because of the so-called liquidity trap when rates are so low that they cannot drop much further. There is lack of sufficient evidence on the success of the Quantitative Easing measures in the existing literature due to the unprecedented nature of these strategies. However, there is some evidence in a recent contribution by Cúrdia and Woodford (2011), showing that QE may not be very useful, and it may even depress the returns (yield) on financial assets, even though asset purchases could be fruitful when there is turmoil in the financial markets. Hence, despite the fact that these measures of low interest rates and asset purchases were important to support the financial sector by providing liquidity, there may be some downsides of these measures reflected in depressed yield on assets, specifically government bonds or gilts.

Figure 3 represents these effects on the most current outlook in this study of real yield curves of gilts. The outlook is very discouraging in real terms, as it is evident that in real terms, the yield curve indicates a negative return in the short term as well as falling returns in the long term (negative risk premium), i.e. between 10 and 25 years to maturity.

In such a situation, the government and financial institutions might be beneficiaries of low cost borrowing and high prices of asset holdings. However, the household constituting pensioners and

Figure 3. Real yield curve for UK government bonds (Gilts).

Source: Bank of England (2013, February).



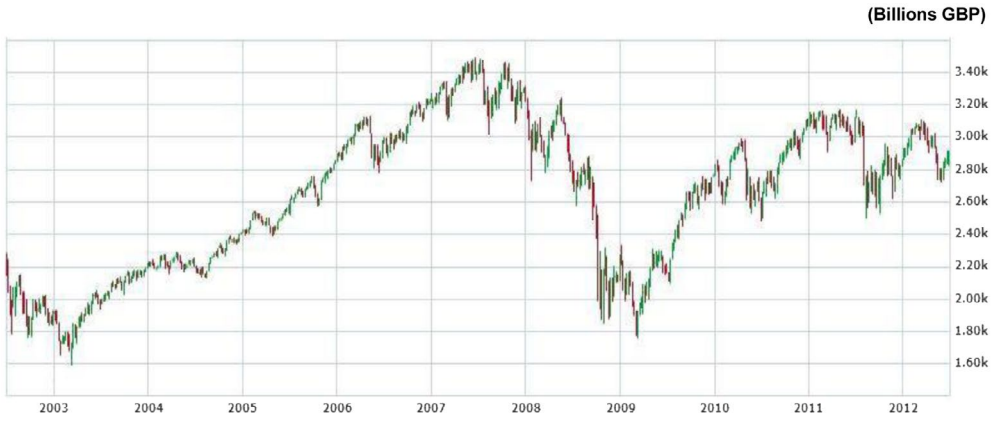


Figure 4. Performance of London Stock Exchange (FTSE All) July 2002–July 2012.

Source: London Stock Exchange (2012).

savers might be on the losing end. Some studies, for instance Moosa (1998), argued that the cyclical relationship of economy and financial markets had been weakened in the post-war period (1946–1991). However, the financial and economic crises which started in 2007–08 proved otherwise. This scenario provides some support for the notion that using fiscal policy as a complementary instrument due to the adverse effects of QEs may be beneficial. A discussion on this perspective will be provided in detail in a later section.

Similar to the bond market, the stock markets have been adversely affected by the financial and economic crises as shown in Figure 4, where we have value of stock index (FTSE-All) on X-axis and Y-axis representing the timeline. The London Stock Exchange (LSE) has faced a series of adverse shocks from the 4th Quarter of 2008 to 1st Quarter of 2009 before settling on a slow and long route to recovery. Perhaps it was the worst performance of the LSE during the last decade and since the technology bubble of (2002–2003).

A visual comparison of Figures 3 and 4 shows that in contrast to the bond market, the stock market comparatively presents a better outlook after the implementations of the policy measures discussed. This contrast indicates an asymmetry to policy responses between the two markets, an aspect of policy that this study is considering.

In the context of recent developments to restore financial stability, it is important to mention here that the BoE has recently set up a Financial Policy Committee (FPC).[10] As cited earlier, there is a major change in the functioning of the BoE since May 1997 when various responsibilities including sovereign debt management and banking supervision were transferred to the FSA and the DMO. Since then, the official mandate of the BoE has been price stability by targeting inflation at 2% of the consumer price index. However, in the context of these changes, it could be well anticipated that in future, the financial sector would also be considered in macroeconomic policy formulation, even though this has not been a normal practice before the crises.

In terms of the financial sector, the role of fiscal policy has not been investigated to the same extent as monetary policy (Jansen et al., 2008) has been. Recent studies have considered it more preferable to use both macroeconomics policies simultaneously while analysing their impacts on the real economy (Gomis-Porqueras & Peralta-Alva, 2010; Sims, 2011). Despite the acknowledged importance of joint macroeconomic policy analyses, most studies in the existing literature have been focused on single policy implementation. The limited number of studies which investigated the effects of macroeconomic policy interactions or combination has only considered impacts on the real economy, and the financial sector has not been a priority concern (Jansen et al., 2008).

As acknowledged in previous paragraphs, the impacts of monetary and fiscal policies are state dependent. This implies that there is a prospect that optimal combination of macroeconomic

policies may also be influenced by the underlying state of the economy. Therefore, the optimality of macroeconomic policy combinations for financial stability in various contexts (the underlying states) should be analysed. There are three interesting aspects of state dependency this study is intending to consider: (1) analysis of intuitional arrangements, (2) alternative empirical approaches/frameworks and (3) major macroeconomic events. There are three reasons for enriching our state dependency with these aspects. First, the literature on the subject has shown a shift in effectiveness of macroeconomic policies followed by structural changes in their formulating institutions (see Lu & In, 2006; Osborn & Sensier, 2009; Semiromi & Reza, 2010), for example, institutional changes in the BoE. Those studies indicated variability in effectiveness of monetary policy post-changes in its intuitional framework. There have been some changes in the structure and arrangements of institutions responsible for design and implementation of macroeconomic policies, for instance, the operational independence of the BoE in 1997. Hence, it is imperative to analyse the dynamics of macroeconomic policy interactions in the light of intuitional changes during the period of the study. Second, the macroeconomic policy literature also shows that either General Equilibrium modelling or Econometrics techniques have been used for empirical analyses. In this regard, Bhattarai (2011) and latter Consolo, Favero, and Paccagnini (2009) highlighted the weakness of a single framework and urged that the DSGE (dynamic stochastic general equilibrium) and Econometrics should be considered complementary techniques rather than competitive ones. Nevertheless, it is not a matter of empirical frameworks only, but the important point is that the Frequentist approach (Econometrics) and Bayesian approach (DSGE) are based on different theorems and could lead to different empirical results and conclusions, a situation called Jeffreys–Lindley's paradox (Robert, 2013). Hence, differences in the fundamental principles of estimation could also have implications for optimality of our policy combinations. Third and lastly, the reason for including the contexts of macroeconomic events is due to the shifts of stock markets' response to monetary policy after an episode of crisis (see Kontonikas et al., 2012; Wong et al., 2006), which is associated with change in market efficiency. This could also have important implications for the optimality of macroeconomic policy combinations.

In the next section, the discussion of some research gaps in the existing body of literature on macroeconomic policy interactions, particularly in the context of state dependency and the effects on the financial sector, will be provided.

3. Research gaps in the existing literature on policy interaction/optimal*[11] combination

Earlier studies have shown that financial markets have substantial effects on the real economy. Therefore, this association creates scope for active monetary response to financial market dynamics. However, a major limitation of these studies was their focus on monetary policy only, even though recent studies have strongly emphasized joint fiscal–monetary policy analyses (Gomis-Porqueras & Peralta-Alva, 2010; Sims, 2011). Macro-prudential policy combinations have also been suggested as an alternative policy combination, but have been heavily criticized for their failure, unlikely beneficial effects and potential risk of coordination failure (Angelini et al., 2010).

Other than urging for monetary response to ensure financial stability, existing studies do not suggest any particular monetary stance in this regard. To support this position, Borio (2011, p. 15) states that "no such agreement as yet exists concerning whether, and if so how, monetary policy frameworks should be adjusted to better support financial and macroeconomic stability. The crisis has generated much soul-searching, but as yet no clear answers". It is worth mentioning that various researchers have also cautioned about aggressive use of expansionary monetary policy for financial market stability as it could adversely affect the real economy (see Airaudo, Nistico, & Zanna, 2008; Bernanke & Gertler, 2001; Giorgio & Nistico, 2007).

This discussion seems to suggest optimally combining macroeconomic policies as supported by Gomis-Porqueras and Peralta-Alva (2010) and Sims (2011) to achieve more effective outcomes for real economy. Despite the acknowledged importance of fiscal policy[12] on the economy, reviewed literature on macroeconomic policies to the best of our knowledge, we could not find a study which

has addressed the issue that fiscal policy could realize the financial sector's stability in the context of its importance for economic stability. Jansen et al. (2008) on the notion of optimal macroeconomic policy combinations reported that the relationship between monetary policy and the US stock market might be influenced by fiscal policy. The study does not suggest any optimal policy combination neither does it give any insight into the effects of policy interactions on the stock or bond markets. This study, however, will take the opportunity to address the subject of optimal policy combinations for the financial sector's stability. The study will also analyse the *symmetry* (homogenous or heterogeneous) of the responses of both markets, i.e. bonds and stocks to macroeconomic policy interactions for the reasons discussed before. In keeping with our earlier mentioned definition of optimal policy combination, we can remind ourselves that a policy combination could only be considered as optimal if it positively contributes to one market, e.g. stock or bond, provided no adverse effects are imposed on the other and vice versa.

As discussed and cited earlier, it is evident that the impacts of fiscal and monetary policies on the bond and stock markets are not consistent and subject to change, often led by business cycle dynamics. In addition, the structure and design of their parental institutions (see Lu & In, 2006; Osborn & Sensier, 2009) and major macroeconomic events (see Kontonikas et al., 2012; Wong et al., 2006) also result in shifts in the impacts of monetary policy. This implies that optimal policy combinations of macroeconomic policies may also vary in their compositions under the influence of business cycles, intuitional designs and macroeconomic events. Therefore, this research takes these factors into account. However, in the existing body of literature on the subject, there is a lack of studies which have analysed the impacts of these factors on macroeconomic policy interactions, for the financial sector's stability and for the real economy.

Lastly, an important context in our consideration of optimal policy combinations is the role of alternative empirical frameworks, i.e. Econometric as well as General Equilibrium frameworks. It is worth mentioning that the Econometric framework would be based on the so-called *Frequentist Approach*, while estimation of the DSGE model would be carried out using *Bayesian techniques*. Apparently, it not just a matter of choosing an empirical approach because more importantly, both approaches have fundamental differences as the Frequentist is deterministic while the Bayesians is a stochastic approach. To accommodate the aforementioned research gaps, this study intends to achieve the following research aims and objectives as stated in the next section.

4. Aim and objectives of the study

The main aim of this research is to theoretically derive, evaluate and recommend an optimal policy framework for financial stability. Hence, the achievement of the main research objective would lead to a recommendation of an empirical framework which further based on macroeconomic policy combination could facilitate the financial sector's stability in various contexts (empirical framework/approaches, institutional framework and macroeconomic events). As the bases for reasoning, the study raises the following research questions:

(1) What are the effects of macroeconomic policy interactions on financial stability?

(2) What is the symmetry (homogenous or heterogeneous) of stock and bond markets' responses to macroeconomic policy interactions?

(3) How do the empirical frameworks, intuitional designs and macroeconomic events influence the composition of optimal macroeconomic policy combinations?

However, critical analysis and reasoning which could lead to answering the research questions could also help to attainment the following specific objectives, which would pave the way to the achievement of the main objective:

(1) To evaluate the impacts of macroeconomic policy combinations/interactions on the financial sector's stability.

(2) To appraise the symmetry of bond and stock markets' responses to optimal macroeconomic policy combinations.

(3) To evaluate the implications of the empirical frameworks, intuitional designs and major macroeconomic events on the optimality of macroeconomic policy combinations.

The first and second specific objectives are limited to the overall impacts of macroeconomic policies on the financial sector's stability. The rationale behind this exercise is that: (1) it would help understand the symmetry of stock and bond markets' responses to a particular macroeconomic policy combination, (2) it would also help analyse how the impacts and composition of "optimal policy mix" change when analysis is limited to one sector, i.e. equity (stocks) markets or bond markets, and vice versa. However, in the third specific objective, we would analyse the robustness of our optimal policy mix in the light of alternative empirical approaches, institutional changes and major macroeconomic events. The achievement of the third objective would help us understand the influences of intuitional designs, macroeconomic events and empirical approach/framework choices on the optimality of the suggested policy combinations.

5. Rationale and contributions of research

Major factors which provide grounds for this research include the significance of financial stability for real economy's stability and scope of policy combination in this context. Certainly, in the light of research gaps acknowledged in the previous section, there is a need for the formulation of macroeconomic policies which could assist in the financial sector's stability due to its importance for the real economy. The *particular segments of financial market* on which this study is focused are the *stock and bond markets*. One reason for this choice is the limited scope of this research but also particularly because of the *wealth effects of stock and bond markets* on the economy (see Airaudo et al., 2015; Funke et al., 2010; Malikane & Semmler, 2008). In addition, Broome and Morley (2004) found that stock prices are significant *indicators of financial crises*. Third and finally, the reason for this choice is due to our *definition of financial stability*, which follows Foot (2003) and Khorasgani (2010), as financial assets price volatility. There are several reasons for the choice of UK as the financial sector rather than any other: including, (1) the relative *size and significance of the financial sector for the British economy as well as international financial system*, (2) the availability of reliable data from credible sources and (3) how well established the macroeconomic policy-making intuitions and financial markets are.

This study is to (1) address the problem of future policy formulation, also in case of conflicting stances of monetary and fiscal authorities, e.g. non-coordinating monetary and fiscal policy-makers. It is to take it further by, (2) bringing fiscal policy on board and finding optimal combination of monetary and fiscal policies which could facilitate stock as well as bond markets, (3) it will also test the optimality of our policy mix in various contexts to understand the dynamics of policy interactions in different circumstances and their implications for the financial sector's stability. Hence, the contributions made by this study would have three remarkable aspects, i.e. pragmatism, theoretical context and its innovation to the application of methodology. The details are explained in the following sections.

5.1. Pragmatism

A significant, perhaps most important aspect of this study is its practicability and pragmatism. Though the coordination among macroeconomic policies has been widely perceived as beneficial, this may not be the case in practise as Niemann and Hagen (2008) accused independent central banks of being reluctant to coordinate with fiscal authorities. In particular to the analysis of the UK economy, Fragetta and Kirsanova (2010) also showed that fiscal and monetary policies act in a non-cooperative manner. They did not however mention the cause of non-cooperation, its implications for the financial sector or the economy and neither gave any recommendations for future policy formulation.

In the context of the present economic scenario, this study provides new perspectives for future policy formulation. An important practical contribution is the incorporation of the financial sector in macroeconomic policy formulation. The rationale to bring financial (stock and bond) markets analysis to the fore is strengthened by the BoE's recent efforts to ensure financial stability and the launch of the FPC. This research also considers state-dependent impacts of policy combinations in the presence of various institutional arrangements and macroeconomic events. This particular feature of the study makes it very pragmatic as we would be able to see how intuitional designs and macroeconomic events define the ability of policies and the contexts in which they are formulated.

5.2. Theoretical context

On the theoretical context, we may not be able to come up with a unified theory on macroeconomic policy interactions, financial sector's stability and state dependency as it is a nexus of theories. To some extent, we can associate this study as mentioned earlier with Minsky (1974) and his recently well-publicized theory of Financial Instability Hypothesis. Despite being limited to private sector debt, this theory would still be categorized as pioneering in highlighting the financial sector's importance for the real economy. Secondly, with regard to the policy interactions, it might be observed that this study in the light of the FTPL emphasized fiscal policy as complimentary to monetary policy. It stemmed from the empirical work of Sargent and Wallace (1981) and their remarkable arguments that the *Friedman's list of the things that monetary policy cannot permanently control may have to be expanded to include inflation*. This theory refutes the concept of the Ricardian Equivalence according to which fiscal policy has no real impact on the economy.

Further to these interesting economic theories, a well-known study by Dixit and Lambertini (2003) also emphasized the importance of cooperation between fiscal and monetary authorities in order to achieve a desirable outcome, for that they coined the term "Symbiosis". To add values to these cited theories, our study is to take it further and bring the financial sector stability into consideration. We would analyse the effectiveness of fiscal policy by the FTPL and Dixit and Lambertini's (2003) strategy of symbiosis could be helpful in the formulation of an optimal macroeconomic policy combination for financial stability due to its importance for economy *as acknowledged by* Minsky (1974).

5.3. Methodological innovations

This study makes a significant addition to the existing literature on the subject area. This study critically reasons the option of alternative empirical frameworks, i.e. DSGE and Econometric frameworks, *for comparison, robustness and overcoming limitations of a particular framework*. Furthermore, it gives a detailed insight into the estimation of the empirical models which could also be carried out using alternative approaches, i.e. the Econometric model by traditional or Frequentist and the DSGE model by Bayesian estimation approach. We would have detailed discussion on both approaches in the next section. The methodological contribution also has a practical aspect as it would elaborate how the choice of empirical framework affects the outcome and resulting policy formulation.

6. Structure of the study

The study consists of three sections which includes the introduction as the first section. The second section will comprehensively review the existing literature on macroeconomic policies, their impact on financial markets and evidence on policy interaction. It will also provide in-depth discussion and insight into the Bayesian approach (based on Bayes' theorem) and Frequentist approach (Gauss Theorem). It would give readers insights into our methodological choices and their impacts on optimal policy mixes, i.e. whether our optimal policy combination is robust against the Jeffreys–Lindley's paradox. Moreover, we will also look at two important elements: firstly, the implications of institutional arrangements and design of macroeconomic policy-making intuitions and secondly, shedding some light on the impact of macroeconomic events for the dynamics of the relationship between the financial sector and macroeconomic policy combinations.

Third, section three would give us an insight into the financial sector (bond and equity markets) of the UK economy. In this regard, some descriptive historical statistics would also be provided to give

the reader a flavour of the subject of the financial sector and its background. Furthermore, the macroeconomic policy framework, its performance in the last few decades and evidence on its relationship with the financial sector would also be acknowledged. Conclusions will be drawn on the basis of in-depth and critical discussion and logical reasoning, and critical review of existing and prevailing wisdom. Moreover, the implications and contributions to macroeconomic policy formulation would also be described. In the last section, some indication towards potential extensions for future research will be suggested.

7. Review of existing evidence on macroeconomic policy's role in the financial sector

In this section, we will comprehensively review the existing literature on macroeconomic policies, their impact on financial markets and evidence on policy interaction.

7.1. Macroeconomic policy interaction

Despite ample effort, we could not evident ample evidence on the impact of macroeconomic policy interaction on the financial sector; however, its influence on real economy would be acknowledged to highlight and establish its importance. Regardless of the limited attention paid to the joint analysis of macroeconomic policies and their interaction, its significance has been frequently acknowledged and increasingly emphasized in recent past. There are a number of current studies we would review, yet the comments by Leeper (1993, p. 3) are very important in this context that ...

> Analysing one policy is like dancing a tango solo: it's a lot easier, but it is incomplete and ultimately unfulfilling.

Indeed, analysing one policy is quite easy; however, it neither shows the complete picture nor leads to a desired outcome. Nevertheless, the arguments by Isaac (2009) are also very interesting on the issue of macroeconomic policy mix. Analysing the interaction between monetary and fiscal policies in the long and short run, it was argued that ...

> The macroeconomic stability does not depend on particular fiscal or monetary policy but on a mix of these policies.

It was also showed that the monetary policy could also overcome the inflationary effects of expansionary fiscal policy, for instance, by influencing inflation expectation by changing its targets. We should also acknowledge the arguments Hughes Hallett and Libich (2007) made, that "it is important to take the government's intentions into account, as well as those of the central bank, if we are to get a realistic picture of the effectiveness of the policies and policy institutions in any economy." The comparative analysis of fiscal and monetary policies' effects on economy by Dungey and Fry (2009) showed that the overall impact of fiscal policy shocks has been larger than monetary policy shocks. In addition, among fiscal instruments, taxation and debt policy shocks have been more significant than government expenditure shocks. Nevertheless, they compare the magnitude of the policy effects, however, as the both fiscal and monetary policies operate simultaneously and there is substantial evidence of interaction in this section; analysing effects of only one policy exclusively may conceal the effects of policy interaction.

In particular to the UK, the monetary and fiscal policies are formulated by separate institutions. The interaction is important as it may influence the real economy as well as financial sector's stability; moreover, the conflicting and coordinating policies may have various implications for economy. The interaction is also important as macroeconomic policies may influence actions of each other; in this context, Neri (2003) observed that as fiscal policy was introduced in the VAR model, the effect of monetary policy decreased to almost half. In a study with similar outcome, where fiscal policy acts as a stabilizer of government debt under various forms of monetary policy, von Thadden (2004) found that the monetary policy may restrict fiscal policy as additional fiscal restraint may be needed under strict inflation targeting which was not required under a constant money growth rule. Similarly, analysing coordination of economic policies and its effects on economy, Barnett (2005) urged that

the fiscal and monetary authorities should coordinate with each other as the fiscal policy often puts some constraints on monetary policy. Moreover, the central bank inflation targeting should be coupled with fiscal constraints. In recent cases of reporting inter-dependence between macroeconomic policies, Zubairy (2009) and rather later Davig and Leeper (2011) also showed that the strong action of monetary policy can restrain the effects of fiscal policy. Consequently, policies influence the role of each other; therefore, their interaction cannot be overlooked.

7.2. Coordinating macroeconomic policies' "symbiosis"

In their study, Dixit and Lambertini (2001) argued that the interaction of the both fiscal and monetary is a recent phenomenon and it has gained importance in the field of economic policy formulation as several studies have considered the interaction of monetary and fiscal policies. They emphasized the coordination between monetary and fiscal policies and cautioned that the non-cooperative behaviour can cause low output growth and high rate of inflation, but if the authorities' preferences coincide, the ideal growth and inflation is attainable. In case of disagreement, the outcome can be influenced by institution design; therefore, it was recommended that giving a leadership role to either monetary of fiscal authority can be fruitful. Latter investigation by Dixit and Lambertini (2003) showed almost similar findings that the optimal results are achieved by consensus of fiscal and monetary authorities on the desirable level of output and inflation, for which they coined the, later became famous, term "*Symbiosis*". Similar and recent study on European Monetary Union (EMU) where monetary policy is formulated at union level (European Central Bank) but fiscal policy is formulated at country level, Ferré (2008) also emphasized that EMU should adopt coordination and exchange of information in fiscal policies as it affects economies in EMU.

In the context of "Symbiosis" discussed in previous paragraphs, a recent study by Di Bartolomeo and Giuli (2011) on macroeconomic policy interaction showed that the symbiosis suggested by Dixit and Lambertini (2003) does not hold under uncertainty effects on monetary policy. They argued that macroeconomic policy uncertainties are not symmetric and could affect economy. Moreover, the role of monetary policy under uncertainty could be affected by fiscal stance. However, in the context of coordination, they unanimously supported the theme; they cautioned on viewing monetary and fiscal institutions as separate entities and urged for coordination in uncertain economic scenario.

For the achievement of economic objectives, Bénassy (2003) emphasized that the optimal combination (household utility and firm profit maximized) of monetary and fiscal policies leads to better outcomes, even when information available to the policy-makers is constrained. In a recent study on dimension of information, the coordination among macroeconomic policies was investigated by Nasir, Ahmad, Ali, and Rehman (2010). Although they reported that there had been very week coordination between macroeconomic policies, yet they emphasized on more coordination and exchange of information among policy-makers for economic stabilization. Similarly, seeing coordination in the light of openness and integration of financial markets, empirical results by Pierdzioch (2004) showed that the higher capital mobility does not reduce the effectiveness of fiscal policy and it is important to consider the interaction of fiscal and monetary policies while considering the integration of financial markets as the fiscal policy shocks propagate through an open economy.

Macroeconomic policy coordination is also important due to the inter-dependence between macroeconomic policies as reported in a recent study by Andrew, Libich, and Stehlik (2011). They found that the macroeconomic policies have spill-over effects on each other, and therefore even formulated independently, they are interdependent. In the medium term, coordination is more important in the context of ambition than conservatism. The coordination is important even when the policies have different objectives, as in non-coordination (Nash Equilibrium) they fall in "tug-of-war". They suggested that the coordination should not be limited to exchange of information but extended to details of each policy. However, they did not provide empirical support to their arguments nor any framework on policy coordination.

7.3. Absence of policy coordination and consequence

Macroeconomic policy interaction is also important for the reason that the conflicting and coordinating policies could have different implications for economy. In this context, Hughes Hallett and Libich (2007) showed that the absence of coordination is damaging for policies' credibility; moreover, it leads towards economic instability. They also declared it necessary to take fiscal and monetary policies' intentions into account to get a realistic picture of the effectiveness of the policies and policy institutions. Similarly, Chadha and Nolan (2007) investigated monetary and fiscal interaction and found that the design of optimal stabilization policy requires consideration of both monetary and fiscal plans. Moreover, "passive" fiscal policy necessitates large long run responses to inflation from monetary policy and aggressive monetary policy may result in an aggressive set of fiscal plans. Similarly, analysing the macroeconomic policy interaction in Romania, Talvan and Lupu (2010) argued that for economic and price stabilities, the monetary policy needs to be supplemented by fiscal policy. However, they went further and also cautioned that the non-coordination between policies could not only lead to economic instability but also social unrest.

A major factor leading to popularity of coordination between fiscal and monetary policies was adverse outcome in the case of conflict between policies, supported by the work of Leitemo (2004), as they cautioned that the Nash game between an inflation-targeting central bank and the fiscal policy authorities may lead to strong interest rate and exchange rate fluctuations due to a conflict over the output gap. Economic fluctuations can be harmful to the financial stability of an open economy; therefore, fiscal policy should support the monetary policy objective to a greater extent. Similarly, the study by Lombardo and Sutherland (2004) also supported the view that the fiscal and monetary policies should be coordinated for welfare gains in monetary union. Passive fiscal policy would be better than non-cooperative fiscal policy; however, non-cooperative fiscal policy can be a better choice if monetary policy is non-cooperative. Most of these studies had been on European Union economy which has its idiosyncratic policy framework, whereas in the UK, both monetary and fiscal policies are formulated at country level.

Analysing macroeconomic policy interaction in Croatian economy in an Econometric framework (Structural VECM model) empirical analysis by Rukelj (2009) showed that the fiscal policy and monetary policy showed negative impacts on each other, which showed that they moved in opposite directions; therefore, they were categorized as substitutes. However, they did not incorporate the outcome of conflicting stance, which might be due to the limited empirical framework.

Specific to an aspect of the financial sector (Forex markets), study by Giorgio and Nistico (2008) showed that in the case of counter cyclical fiscal policy, fiscal discipline plays an important role in the movement of exchange rates and Net Foreign Assets. "Most importantly, they cautioned that monetary authority's solo efforts to stabilize the financial sector (Net foreign Assets) fluctuation may results in high volatility of Forex." Similarly, appreciating the macroeconomic policy coordination, Hanif and Arby (2009) argued that the monetary and fiscal measures may conflict with each other; *poor coordination could lead to financial instability (interest rates and Forex volatility) high inflation and instable growth*. In their economy analysis of Pakistan, the Monetary and Fiscal Policy Coordination Board had been established for the purpose. However, in their later study, Arby and Hanif (2010) showed that the monetary policy stance has shown a poor coordination with fiscal policy in Pakistan. The institutional arrangements, i.e. establishment of Monetary and Fiscal Policies Coordination Board, could not contribute towards coordination. This finding would be interesting in the UK context as the Monetary Policy Committee (MPC) of the BoE responsible for formulation of monetary policy has representation of fiscal authority (HM Treasury); our empirical findings in this study would give us further insight if this arrangement had been successful for policy coordination.

7.4. Fiscal coordination for monetary policy objectives

The prime objective of a monetary authority is price stability; however, it may not be achievable by monetary policy on its own as a study by Beetsma and Jensen (2005) found that a negative supply shock raises the inflation and requires fiscal contraction. They also urged that there is more fiscal

coordination needed in Europe as the fiscal policies are formulated in national interest. Similar study by Eichengreen (2005) criticized monetary and fiscal policy framework and SGP poor performance as the European Commission cannot fully enforce fiscal policy matters. They also urged for cooperation from fiscal authorities.

Analysing the influence of fiscal policy on monetary policy role, Doughty (1991) argued that the fiscal policy stance influences the role of monetary policy and inflation at two levels: (a) in the short term, fiscal policy affects the transmission of monetary policy (b) while in the long term, it affects the sustainability of monetary policy. The channels through which it influences monetary policy are domestic demand, interest rates, capital market effects and inflation effects. In practice, fiscal policy affects the monetary policy inflation-targeting strategy. Moreover, the sustainability of fiscal policy (debt stabilization) also affects monetary policy objective achievements in the long term. Therefore, it was urged that the fiscal stance should be considered for monetary policy price stability objective and overall policy framework. In a later study, investigating importance of fiscal cooperation for monetary policy, Forlati (2006) argued that in an open economy scenario, there is incentive for fiscal policy to use the tax instrument. Therefore, it was argued the fiscal policy cooperation is important for monetary policy. Later study with similar outcome by Schabert (2006) showed that the monetary policy objective of price stability relies on fiscal policy stance. The monetary policy should not behave aggressively towards achievement of its object, yet fiscal policy should also support (balanced budget) monetary policy objective.

In recent evidence, analysing the effects of monetary and fiscal policies' interaction in the context of fiscal policy effect on monetary role in price stability, investigation by Libich et al. (2011) showed that the effects of undisciplined fiscal policy can spill over to monetary policy role in price stability. It was suggested that the monetary policy should be made more explicit (inflation targeting) and show commitment (transparency and accountability) towards price stability. Their argument was that this mechanism would work as a partial substitute of monetary independence and coordination from the fiscal authority. However, their arguments require empirical validations as absence of coordination could bring sub-optimal results as acknowledged in a previous section. In the context of allocating leadership to a policy, analysing macroeconomic policy interaction in the EMU under three scenarios (Fiscal Lead, Monetary Lead and simultaneous policy formation), the study by Hallett (2008) concluded that the fiscal leadership along with instrument independence and central bank independence results in a better outcome for output, inflation and fiscal balances. Furthermore, it provides fiscal stability without engaging into fiscal rules. The results were robust against fiscal override, market reforms, globalization and changes in savings. However, it was cautioned that in case monetary authority gets leadership, target and instrument setting could cause adverse effects. Their suggestion to allocate leadership to fiscal policy supported its role even for price stability, a basic objective of monetary policy.

As briefly discussed earlier, a prominent limitation of monetary policy is the zero-bond or so-called liquidity trap. In practice, the BoE has set interest rates at an all time low (0.5%) since March 2009, which is almost zero-bonds. This limitation of monetary policy in the light of macroeconomic policy interaction was investigated by Dhami and Al-Nowaihi (2009). They showed that a target (inflation or output) for one policy-maker that ignores the incentives and constraints faced by the other policy-makers can lead to extremely poor outcomes. They argue that the fiscal policy expansion is fruitful in the liquidity trap when an independent central bank is not very effective. They also urged to avoid giving monetary and fiscal authorities high targets and suggested some dependence on costly fiscal policy in a liquidity trap. However, their arguments were based on a theoretical model without substantial empirical support.

7.5. Monetary coordination for fiscal objectives

Fiscal policy is often the mandate of a political administration which also has responsibility of economic growth, perhaps a superior and politically profitable objective. Analysing the economic and political aspects of macroeconomic policy interaction, Nordhaus (1994) argued that the deficit

reduction can result in an electoral cycle (political effects) if monetary policy is non-cooperative and monetary authority may not offset the contractionary effects of fiscal policy. It was cautioned that the poorly timid deficit reduction can have adverse effects of real economy for a decade or longer; this deficit reduction can increase domestic and foreign investments, but if the monetary policy is non-cooperative (contractionary), there can be an adverse impact on economy. However, in case of monetary cooperation with simultaneous and sufficient monetary expansions (rate cuts), the gains are very high.

In a later study, Shively (2004) empirically showed that the monetary and fiscal policies' shocks dominate output fluctuations in the contractionary regime. It was urged that the policy-makers should focus on macroeconomic policy which minimizes the fluctuation of economy as well as policies which maximize the level of aggregate supply. Their findings supported the Keynesian view of stimulating aggregate demand by fiscal policy. Interestingly, they urged monetary policy cooperation for this purpose. Analogously, analysing effects of fiscal policy on output growth in the US economy, Zubairy (2009) showed the fiscal policy (Spending) effects economic growth. Most importantly, it was showed that the strong action of monetary policy can restrain the effects of fiscal policy. Therefore, these findings have important implications for simulation of economy and the financial sector by fiscal expansions and influence of monetary on their association.

The scope of monetary policy in fiscal efforts to stabilize economy was brought into analysis by Leith and Wren-Lewis (2006). Focusing on EU, they found that if the monetary authority does not adopt active inflation-targeting policy, it helps the fiscal authority to stabilize government debt and has a strong impact on output and inflation. Otherwise, conflicting policies can cause macroeconomic instability. They further emphasized that restriction on fiscal policy requires supporting active monetary policy. In EU if a fiscal authority cannot meet fiscal requirements, monetary authority has to adopt a passive stance to stabilize debt equilibrium by reducing debt cost. Seeing this complementarity of monetary policy for fiscal policy in the context of fiscal measures in post-financial crises (2008–09), Midthjell (2011) argued that the outcome of fiscal measures is not certain as it depends on choice of instruments and monetary stance. Moreover, there is limited space for fiscal policy to manoeuver due to the limits of public debt and deficit. On the same dimensions, investigating design of optimal monetary and fiscal stabilization policies, Ferrero (2009) showed that the optimal monetary policy takes the form of a flexible inflation targeting, while the optimal fiscal rule prevents national governments from creating inflationary expectations at the union level. Strict inflation targeting by the monetary authority in a currency union level and fiscal flexibility were recommended, as flexible debt targeting improves welfare. Although findings and recommendations may vary from a non-monetary union country like Britain with particularly economic environment, most importantly, fiscal flexibility may lead to excessive sovereign debt issues, e.g. Greek and Ireland cases as mentioned earlier.

The role of monetary and fiscal policies in the light of Consensus Assignment (monetary policy look after inflation and output, while fiscal does debt stabilization) was analysed by Kirsanova, Leith, and Lewis (2010). It was argued that in New Keynesian framework, monetary policy dominates fiscal policy for inflation and output stabilization, also in a situation when monetary policy cannot control inflation; therefore, it was suggested that this aspect focusing on monetary policy only should not be overstated. Moreover, they also supported the role of monetary policy in debt stabilization as it costs less than in the general perception and is effective in swift stabilization. Hence, fiscal policy does not dominate in debt stabilization. Though their analysis lacked empirical support, however, based on theoretical model, their augments established the importance of monetary policy in a fiscal role.

In the context of this study, the prime focus is on the financial sector rather than real economy, although the financial sector's stability is not a formal objective of fiscal authority; the unconventional steps (bailouts) taken by various fiscal authorities mentioned earlier could associate financial stability as an implicit object of fiscal authority.

7.6. Macroeconomic policy formulation: discretion vs. commitment

Policy formulation can be either by discretion of policy-makers or by following predetermined policy rules. There are mix arguments on the choice of discretion or commitment. In the critical analysis of the US macroeconomic policy, Tager and Van Lear (2001) urged that the fiscal and monetary policies' rules may not be as successful as there can be the problem of rigidity with policy rules. Policy rules do not help the people and organization left behind the market. There was no analytical model or data used in their research; therefore, their arguments were not supported by empirical evidences. More recent analysis by Adam and Billi (2011) showed that the discretionary macroeconomic policies cause high economic volatility and fiscal imbalance. To deal with this situation, they suggested a conservative monetary authority completely focused on inflation and determined after fiscal policy. However, if monetary policy is formulated before fiscal policy or simultaneously, it loses optimality, even in the case when fiscal policy overlooks its impact on a monetary policy role. Nevertheless, their assertion on non-cooperating monetary policy rules raises concerns about the adverse outcome in case of policy conflict as mentioned earlier.

Contrarily, we can also acknowledge some evidence in favour of commitment of macroeconomic policies; for instance, a study by Pappa and Vassilatos (2007) claimed that in a monetary union, constrained fiscal policy with clear rules and active monetary policy for inflation control is necessary for macroeconomic stability. Strict fiscal rules are effective in price stability and are also not that much unbearable as they have been thought. However, their arguments were opposing to the idea that the aggressive policy actions could hamper economic and financial stabilities.

7.7. Popularity of policy interaction in euro zone

Most of the study considering policy interaction had been focused on EMU; hence, Semmler and Zhang (2003) associated a whole aspect of literature on policy interaction to the Euro Zone. Prominent studies on the Euro zone, for instance Lombardo and Sutherland (2004), Beetsma and Jensen (2005), Leith and Wren-Lewis (2006) and Ferré (2008), have urged for coordination between macroeconomic policies as it positively affects real economy. They also cautioned that the conflicting policies can cause economic instability. Interestingly, the analysis by Muscatelli, Tirelli, and Trecroci (2004) declared that the interaction depends on the nature of the shocks hitting the economy, for the cases of output shocks, fiscal and monetary policies tend to act in harmony, whereas they are used as substitutes following inflation shocks. They also urged that the fiscal–monetary interaction depends on the model used to fit the data. The strategy of employing different methodological frameworks in this study (DSGE and Econometrics) will further elaborate any dependence of fiscal–monetary interaction on empirical framework.

As in the Euro Zone, macroeconomic policies are formulated at union (monetary) as well as national (fiscal) levels. The policy formulation at different levels has created a situation where there might be chances of conflicting policies. A study on conflict of monetary and fiscal policies in currency union by Sanchez (2010) showed that in a currency union due to the free ride of fiscal policies on monetary authority a high volatility in Money markets occurs (interest rates). Therefore, it was suggested that small countries should maintain their monetary sovereignty. Although they did not provide empirical support to their theoretical inferences, yet recent Euro crises is a clear evidence on this issue. Moreover, their arguments were supported by a study analysing the strategic interaction between monetary and fiscal policies in a currency union carried out by Grimm and Ried (2007). They found that in a currency union where monetary policy is formulated union wide, fiscal policy is formulated strategically at country level (heterogeneously) for national objectives. The best outcome is, in the case, when monetary and fiscal policies are agreed on optimal output and inflation level, however, they declared it unrealistic. Therefore, the preferences may not coincide leading to worst effects. It was suggested that the monetary authority should be given a lead role. They urged to reduce heterogeneity of fiscal policies for long-term economic stability in EMU. A later study on the same issue of country size asymmetries by Machado and Ribeiro (2010) showed that in a non-cooperative scenario, small countries lead to active fiscal policy, while large countries adopt a moderate fiscal stance. Furthermore, non-cooperation leads to improved (reduced) outcome for small (large)

economies. However, they also supported the policy cooperation as it leads to overall better outcome on union level.

Heterogeneity of agents (fiscal authorities) in EMU has also created a complex situation for macroeconomic policy responses to a shock; it would be interesting to briefly acknowledge a study by Aarle, Garretsen, and Huart (2003) as they analysed monetary and fiscal policies' interaction in the light of spill-over effects between Euro area and non-Euro area economies. It was shown that the exchange rates' adjustment acts as an important stabilizer in the case of external shock to the Euro zone. However, in the case of internal and asymmetric shocks, it is not the case. They associated this feature with the common monetary policy by ECB. Moreover, they also acknowledged that in the case of symmetric shock and symmetric economic structure, it is easier to implement appropriate monetary policy than in case with asymmetries. Similarly, the heterogeneity in EU and its implications for policy interaction were investigated by Asensio (2007) using a Keynesian framework. It showed that the heterogeneity has important implications for policy interaction in monetary union. Contrary to symmetric, monetary–fiscal instruments respond to almost every shock in a heterogeneous environment. The interaction could result in inefficiencies, for instance, unemployment and inflation. It was suggested that monetary policy should focus on common effects of shocks, while fiscal authorities should focus on idiosyncratic shocks. They associated it with a subsidiary principle of macroeconomic policy in the Euro zone.

Particularly, in a scenario when substantial aspect of research on interaction is only focused on Euro zone (Semmler & Zhang, 2003) where monetary policy is formulated by the European Central Bank (ECB) at union level but fiscal policies are formulated at country level, it may not be appropriate to generalize the policy recommendation to an economy with monetary sovereignty. Perhaps, the role of macroeconomic policies and their interrelation in the EU has its own idiosyncratic nature and may not be appropriate to be generalized for economy like the British. In this context, on the basis of comprehensive study, Viegi (1999) concluded that in a monetary union, the default risk can be used as a tool to gain bail out, particularly by large countries, although this privilege may not be available to non-union members. It was also cautioned that ignoring the long-term consequences of fiscal indiscipline could cause high debt and inflation issues; therefore, sound fiscal policies should be adopted. Moreover, in a monetary union, fiscal policy has spill-over effects and it was cautioned that it could lead to high inflationary stance by all fiscal members. Although the independence of central bank was appreciated, however, its possible conflict with fiscal policy was considered counterproductive. The independence of central bank leads to active use of fiscal policy by the government as price becomes a less important objective and associated with monetary authority. Obviously, this could not be the case in the UK where fiscal authorities would have some concern about inflation due to country-wide scope.

7.8. Macroeconomic policy interaction and crowding out

Although the crowding out aspect of fiscal policy in stock and bond markets could not be evident, a study by Stemp (2001) on investigating Australian foreign exchange markets concluded that fiscal policy can affect the exchange rate temporarily as an expansionary fiscal policy is crowded out by exchange rate appreciation, while contractionary policy is crowded out by exchange rate depreciation. There were no empirical methods used; critical analysis was based on arguments stemming from theories and current economic situation. The important point here is if we add exchange rate crowding out to consumption and investment crowding out (mentioned earlier), are there some crowding out effects of fiscal policy on bond and stock markets? If so, how does interaction with monetary policy influence fiscal policy and the financial sector relationship? In this regard, the study on foreign exchange markets and macroeconomic policies by Cook and Devereux (2006) supported flexible exchange rate as it can increase performance of fiscal policy and capital inflow and also emphasized on coordination between fiscal and monetary policies.

7.9. Favouring non-coordination

Apart from frequent evidences in favour of macroeconomic coordination cited in previous paragraphs, there are also some studies, for instance Adam and Billi (2011), which argued that the fiscal policy could adopt a non-cooperative stance. Therefore, a conservative monetary authority should completely focus on its mandate of price stability and determine its stance after fiscal policy. Nevertheless, on this aspect, analysing interaction between monetary and fiscal policies in the EMU, a comparatively comprehensive theoretical framework (without empirical validation) by Staudinger (2003) showed that the monetary authority (ECB) is always better off if it takes a leading role (Stackelberg leader); however, for fiscal policy, it depends on the weights given to the inflation and output, which was non-cooperative (Nash) in most of the scenarios considered. Similarly, analysing the roles of optimal fiscal and monetary policies in economic stabilization, Beetsma and Jensen (2005) claimed that if the price rigidities between countries in a monetary union become equal, the stabilization is only done by monetary policy without requiring effort from fiscal policy. On the other hand, we must remember that a non-coordination scenario was discouraged in the same framework (Game Theory), prominently by Leitemo (2004) and Chadha and Nolan (2007) as they cautioned that the Nash game between monetary and fiscal authorities could be harmful to economy; therefore, fiscal policy should support the monetary policy objective.

Some support to independent macroeconomic policy formulation was given by Leciejewicz (2010) while analysing the need for macroeconomic coordination vs. independence in the light of theoretical framework (Game Theory). It was shown that there is also a possibility of a different situation, where the independent decision between monetary and fiscal authorities may not lead to an adverse (Pareto non-optimal) scenario. However, it was also stated that the choice of instrument and policy mix depends on the effectiveness of that policy or instrument and background economic scenario. Most importantly, the idea of coordination could not be fully rejected in this study, as it was also acknowledged that for higher output growth, expansionary monetary policy should be coupled with tight fiscal stance.

Instead of monetary–fiscal coordination, a comparative analysis between monetary–fiscal and fiscal–fiscal policies' coordination in EMU was made by Carlberg (2004). It was argued that the cooperation between fiscal authorities (German and French) and monetary authorities leads to full employment. The monetary independence and cooperation between fiscal authorities also leads to full employment; therefore, it was urged that the cooperation is not compulsory as the required output could also achieved without cooperation. Although their assertions lacked empirical support, in a non-union country, for instance UK, there is only one fiscal authority; thus, we cannot go far on this dimension.

Analysing the implications of macroeconomic policy coordination in the long and short terms in EMU, Hagen and Mundschenk (2002) argued that in the long run, the price stability can be achieved without coordination as tight fiscal policy in future would offset the expansionary (inflationary) stance of the present fiscal policy. However, this argument raises a few doubts as what if an automatic stabilizer would not work in the long term? Future taxes could not balance the books and what if inflation could not be stabilized? Nevertheless, they implicitly answered these concerns by acknowledging the need for coordination in the short term as lack of it could lead to adverse economic conditions. Therefore, it needs to have consensus on aggregate output and price level in EMU between monetary and fiscal authorities. They also declared current level and arrangements of policy coordination insufficient.

An important implication of FTPL is that the "Inflation is also a Fiscal phenomena". The validity of FTPL and monetarist doctrine was carried out by McCallum and Nelson (2006). They showed that both interest rates' rules and money stock rules share the opinion that the inflation is also a function of fiscal policy. However, they suggested that detailed coordination between macroeconomic policies is not needed as monetary authority can achieve price stability at its own. Nevertheless, their

unwarranted assertion raises a major concern that if fiscal policy also has a permanent impact on economy, how could monetary policy achieve its objectives on its own in case of a policy conflict?

A study in this context was performed by Buti, Roeger, and Veld (2001); their theoretical analysis and numerical simulation showed that the complementarity (coordination) and substitutability of macroeconomic policies and their preferences with respect to each other depend on shock hitting the economy. In the case of supply shocks, they move in opposite ways, while in demand shock, they move in same direction; although their comprehensive analysis favoured coordination to some extent, yet they associated coordination as dependent on shock hitting the economy which implies *that the coordination is vulnerable to the exogenous factors*.

Regarding the issue to coordinate or not to coordinate, Niemann and Hagen's (2008) argument is that the independent monetary authorities are reluctant to coordinate with fiscal authorities. To support their point of view, they gave the reference of European Central Bank's (ECB) first President Duisenberg (2003); there is clearly no scope for coordination between monetary and fiscal policies, If that is really the case, the practises by the monetary authorities are not in line with the researchers. Nevertheless, supportive arguments on non-coordination were given by Nyamonga, Sichei, and Mutai (2008) while analysing the behaviour of macroeconomic policies in Kenya. It was reported that during the time horizon of study, the monetary and fiscal policies have shown coordination in a few periods while some periods lacked coordination. They found evidence of monetary policy dominance and declared it as a cause of less harmful outcome during times of non-cooperation. On the other hand, a study on providing evidence on practises of macroeconomic policy coordination in the USA, Astudillo showed that most of the time policies were complementary to each other for stability. We would see this phenomenon in the context of UK economy in the next section.

They majority of studies on economic policy interaction have urged for coordination between policies. Followed by many others, a landmark study was by Dixit and Lambertini (2001, 2003) which gave the thought of "Symbiosis"; how to coincide for the financial sector's stability is still an un-answered question. Moreover, when we compare the empirical work on macroeconomic policy coordination, there are differences of opinion. von Thadden (2004), Schabert (2006) and Ferrero (2009) urged to avoid very strict monetary policy for inflation control and emphasized on fiscal discipline. Similarly, passive monetary and expansionary fiscal policy was suggested by Traum and Yang (2011) for increased output. Contrarily, Barnett (2005), Pappa and Vassilatos (2007) and very recently Davig, Leeper, and Walker (2011) urged for constrained fiscal policy but strict monetary policy for the same objectives. Focusing on real economy (inflation and output), these studies have conflicting conclusions. Obviously, in the light of these contradictory arguments, we cannot suggest a solution for the financial sector of a particular economy unless a comprehensive empirical analysis is performed.

7.10. Interaction and institutional arrangements

The significance of intuitional arrangements for an individual policy role has been acknowledged earlier; however, its implications in addition to macroeconomic events could affect the way macroeconomic policy interacts. In this context, analysing macroeconomic policy interaction in Indonesia, Mochtar (2004) found that the Asian Financial Crises (1997) lead central bank to run Quasi Fiscal Activity (QFA). They also briefly looked into the central bank independence and urged that the central bank has given independence in Indonesia, yet it demands fiscal discipline in controlling inflation. They cautioned that the fiscal indiscipline could put the inflation-targeting effort by monetary authority in vein. Moreover, it causes tight monetary policy which leads to further appreciation of exchange rates and results in further inflation. Therefore, they urged on fiscal policy cooperation in inflation control, despite monetary independence. However, briefly acknowledging the role of intuitional arrangements in macroeconomic policy interaction, Javed and Sahinoz (2005) argued that the fiscal authorities have conflicting incentives, targets and objectives. Therefore, they urged allocation of intuitional arrangement to monetary policy with regard to fiscal stance. Nevertheless, they also agreed on the idea of coordination for external and internal balances in economy.

There are conflicting opinions on independence of monetary authority; analysing the policy interaction in Russia, Merzlyakov (2011) argued that the independence of a central bank does not considerably influence policy impact. The macroeconomic policy interaction was most influential under fiscal policy as Stackelberg and cooperation and Cournot interaction (complete non-coordination) lead to adverse economic outcome. Contrarily, a similar study with an advantage of empirical support on the effects of setting an inflation target for monetary policy on performance of macroeconomic policies by Franta, Libich, and Stehlik (2011) showed that the fiscal indiscipline could affect monetary policy role; however, a legislative inflation target could help monetary policy control excessive fiscal spending. Moreover, the explicit inflation targeting could also lead to fiscal discipline.

Analysing the macroeconomic policy interaction under various exchange rates' regime, Claeys (2004) showed that the expansionary fiscal policies for output growth cause monetary policy to adopt a tighter stance, particularly in countries with a flexible exchange rate. However, in countries with fixed exchange rates, the results were not significant. It was also emphasized that the shifts in exchange rate policy regime are important. A similar and more recent study on macroeconomic policy exchange rates and implication of monetary independence was carried out by Park (2008). Interestingly, it was argued that often the exchange rate policy was not affected by monetary and fiscal policies; the central bank degree of independence does not affect price level. In specific to the UK economy, there have been prominent changes in exchange rate mechanism, for instance, abandoning the Exchange Rate Mechanism (ERM) in 1992 which may have important implications for policy coordination and interaction.

The importance of institutional design and arrangement in the light of various studies has also been acknowledged in literature review chapters; however, we would very briefly revisit a few evidences to refresh the memory of the reader and to establish its relevance with subject study. The addition of institutional arrangements aspects is motivated by the arguments by Srinivasan, Jain, and Ramachandran (2009), that the institutions must be designed so that the central bank's commitment to its objectives is not in doubt. In this context, the financial stability has not been a prime objective of any central bank, at least not explicitly, to the best of our knowledge; however, if intuitional design affects the outcome of macroeconomic policy, it raises the question about its implications for the financial sector.

One of the major institutional arrangement been made during the time of study was independence of the Bank of England. This may sound a simple case of giving autonomy to monetary authority to achieve its prime objective for price stability; perhaps, it was the explicit good intention. Nevertheless, it was rather a more complex and vital change in the functioning of the BoE. Specifically, subject decision resulted in a big shift in intuitional design and certain responsibilities related with financial stability, e.g. banking sector supervision and management of sovereign debt were transferred to Financial Serves Authority (FSA) and DMO. *The most significant are: a) the supervision of banking sector which was transferred to Financial Services Authority (FSA) and b) the responsibility of sovereign debt stabilization which was transferred to Debt Management Office (DMO).* These are the major shifts in responsibilities and authorities with an intention to increase the efficiency of policy formulation; however, these changes may have important implications for the financial sector. Perhaps the recent or post-financial crises development and revival of the BoE role in financial stability is something that requires plentiful attention. The Financial Services Act (2012) leads to major reform in the form of formulation of FPC. The prime objective of the Committee is to identify, monitor and take action to reduce systemic risk for the protection and resilience of the British financial sector. In addition to that the Prudential Regulation Authority (PRA) as a part of the BoE also started to function from April 2013 with the objection of banking sector supervision. In specific to effectiveness of macroeconomic policies and financial stability, these intuitional changes raise questions whether the withdrawal of earlier cited responsibilities of financial supervision from the BoE influenced macroeconomic policy role.

In this context, a study by Weymark (2007) declared that a fully independent central bank is only concerned with achievement of economic objectives, whereas fiscal authority may influence monetary framework. However, we need to validate these assertions and extend them to the financial sector. We can report some evidence on this aspect in a US case; Lobo (2000) concluded that the Federal Reserve policy of immediate disclosure has resulted in change of volatility of stock market from before to after the announcement of monetary policy decisions. Later investigation by Lobo, Darrat, and Ramchander (2006) also acknowledged that the Federal Reserve disclosure policy has influenced the impact of monetary policy on foreign exchange markets. However, we need to see it in the context of Optimal Policy Combination as well as both financial market (stock and bond). In specific to our case, Bank of England has been independent since 1997 which may have important implications for macroeconomic policy interaction and the financial sector. With regard to the macroeconomic policy interaction and real economy, we can associate the remarks by Dixit and Lambertini (2001) as they argued that in the case of disagreement, the outcome can be influenced by institution design.

Despite the fact that we could not evidence, many studies on policy coordination in the light of institutional design, yet there is a work done by Arby and Hanif (2010). It was showed that the monetary policy stance has shown a poor coordination with fiscal policy in Pakistan. The institutional arrangements, i.e. establishment of Monetary and Fiscal Policies Coordination Board, could not contribute towards coordination. This finding would be interesting in the UK context as MPC of the BoE responsible for formulation of monetary policy has representation of Fiscal authority (HM Treasury); our empirical findings in this study would give us further insight if this arrangement has been successful for policy coordination.

In addition to the independence of the BoE, a major change in the institutional framework of the BoE was an explicit target of price stability by keeping inflation to 2% of Consumer Price Index (CPI) or *Target 2.0*. On this aspect, Haldane and Read (2000) investigated the role of monetary policy under the influence of inflation targeting and its effects on bond market (yield curve). They found that introduction of inflation targeting in UK has significantly decreased the effects of monetary policy surprises on yield curve. They associated it with the increased transparency of monetary policy due to inflation targeting. Yet, we are seeing this shift in association with addition of interaction with fiscal policy stock market.

If we review the literature on the performance of policy framework, institutional design of monetary policy in the UK was praised by Bhundia and Donnell (2002), arguing that independence of central bank and institutional arrangements is based on the principles of credibility, flexibility and democratic legitimacy. Therefore, the independence of the BoE has not only increased the effectiveness of monetary policy, it has increased the fiscal coordination. Their arguments were logical, but there was no empirical evidence. In addition, this assertion also requires validity for the financial sector and most importantly its combination with fiscal policy.

More recently, analysing institutional changes, Osborn and Sensier (2009) found that there was a strong evidence of structural break coinciding with the introduction of inflation targeting. They declared the inflation targeting as more important change than the independence of BoE. Similarly, Lildholdt and Wetherilt (2004) concluded that the ability of market participants to predict monetary policy stance by BoE has been improved. Later, analysing economic and structural changes in the UK economy (output, inflation and Forex), under different monetary regimes, Baumeister, Liu, and Mumtaz (2010) found that there had been a shift in response of monetary policy from economic growth and exchange rates' fluctuation to inflation at present. They also acknowledged that economic fluctuation was less frequent after 1992 until recent past, though they did not associate it with any institutional aspect. The subject study urges to see their assertions in the light of comprehensive and alternative empirical frameworks and its implications for the financial sector.

7.11. Tinbergen principle not asserting a solution

An important aspect in policy interaction of combination is the Tinbergen Principle, according to which there should be equal numbers of instruments and targets. Therefore, one could argue that the idea of policy combination is based on Tinbergen thoughts. In this context, there are very interesting arguments by Hughes Hallett et al. (2011). They argued that "Let us note that **there will be no additional policy instrument to achieve the financial stability goal** (in the spirit of Tinbergen, 1952). Nevertheless, they also urged on the joint use of policies to achieve optimal results and warned that **it is never socially optimal for monetary policy to do the job on its own**." Furthermore, the ability of macroeconomic policies to stabilize the household and public debt depends on features of economy and preferences of monetary and fiscal policies about output and inflation. In some cases, both policies could be used while in some situations, one single policy is beneficial. It was also warned that the both policies could have a moral hazard of being not very active and passing the responsibility to other for which they used to term "Passing the Buck". Similarly, discoursing the generalization of the Tinbergen Principle, Agenor and Silva (2012, p. 6) argued that the "Tinbergen's principle is concerned with the existence and location of a solution to the system; it does not assert that any given set of policy responses will, in fact, lead to that solution. To assert this, it is necessary to investigate the stability properties of a dynamic system." In simple words, one policy combination does not fit all and Tinbergen does not suggest any policy combination either. Most importantly, it is not only the number of instruments, as some policy instruments might be more effective than others in particular scenarios (state dependency).

7.12. Interaction and the financial sector (stock and bond markets)

Studies on macroeconomic policy interaction acknowledged in the above lines have been only focused on real economy (inflation and output) and none of them brought the financial sector (stock and bond markets) into consideration, despite its accepted importance. The very first and probably only study which jointly considered fiscal and monetary policies in the financial sector analysis was carried out by Jansen et al. (2008). Though they did not suggest any optimal combination of policies, they reported that the relationship between monetary policy and the US stock market could be influenced by fiscal policy. They showed that the impact of monetary policy on the asset markets varies with the state of fiscal deficits or surpluses. Their empirical results were consistent with the notion of strong interdependence between monetary and fiscal policies. Perhaps, they also declared it as the first effort in this dimension, but with limited empirical framework (semi-parametric regression); policy interaction or combination was not considered thoroughly and the study was only focused on analysing the impact of monetary policy on the financial market under fiscal policy influence. Semi-parametric regression contains assumptions which could lead to inconsistency and misspecification. Equally focusing on both monetary and fiscal policies, this study offers DSGE and VAR models which are very comprehensive frameworks. Most importantly, this study aims to find optimal policy combination for financial stability (stock and bond markets) in the light of state dependency. Perhaps, the US stock markets have certain characteristic which make them different from the UK as identified by Yang et al. (2009), i.e. risk and behaviour/pattern of markets. In the next section, we would briefly review the financial sector (stock and bond markets) in the UK and evidence the performance of macroeconomic policies.

8. Conclusions

The macroeconomic policy is a vast subject and an important aspect of macroeconomics, perhaps due to its importance as well as its national and international implications it has been given significant attention to. Moreover, a substantial review of macroeconomic policy literature in the above lines indicates that the performance of the financial sector has crucial implications for real economy. The volatility in financial markets could hamper the economic growth and objective of macroeconomic policy-makers. It has also been acknowledged that the macroeconomic policies could influence the financial sector. Hence, due to the importance of financial stability for the real economy and effectiveness of macroeconomic policies for the financial sector, it creates scope of active policy responses to the financial sector's dynamics. Nevertheless, it is also evident that the solo efforts of a macroeconomic policy have not been very successful and often bring some adverse side effects.

Therefore, it is absolutely vital to consider both monetary and fiscal policies and analyse how their combination could positively influence the financial sector.

In addition, there are three more aspects we need to consider. Firstly, we are to consider the intuitional changes in macroeconomic policy framework. The existing studies have evidenced significant effects and implications of intuitional changes in the role of macroeconomic policies. We need to look at this factor in the context of macroeconomic policy interaction and its influence on financial markets. Secondly, there is evidence on the shift of monetary policy and financial market relationship after a major macroeconomic event. Therefore, we also need to consider the implications of such events on optimality of policy combination for financial stability. Thirdly, studies in the existing literature on the subject have either used Econometric or General Equilibrium framework and Frequentist or Bayesian approach. However, both frameworks and empirical approaches have their own advantages and limitations. Some recent studies have also urged the use of alternative approaches. Therefore, in specific to the subject, we are incorporating both empirical frameworks and approaches for the validation and robustness of our results.

9. Macroeconomic policies' framework and the financial sector in the UK

Macroeconomic policies in subject economy are formulated by separate institutions at country level; this is in contrast to the Euro zone; therefore, we can expect more national interest and perhaps country-specific context. In the UK, Her Majesty's Treasury (HMT) is responsible for the formulation and implementation of fiscal policy, whereas monetary policy is autonomously formulated by the BoE since its independence in May 1997. Moreover, the BoE has an explicit price stability objective, i.e. 2% rate of inflation (consumer price index), which is targeted by interest rate instrument. The decisions on monetary policy are made by the MPC on monthly bases. In case the inflation target is missed by 1% below or above the target rate, the Governor of the BoE has to write a letter to the Chancellor of the Exchequer to explain the causes. The MPC consists of nine members including five members from the BoE and four external members selected by the Chancellor of the Exchequer.

Before we go towards macroeconomic policy interaction, it is worth mentioning here that the performance of macroeconomic policy framework in subject economy is controversial as Haldane (1997), Bakhshi, Haldane, and Hatch (1997) and Osborn and Sensier (2009) appreciated its role, whereas Henry (2001) hugely criticized the performance of macroeconomic policies. In a later study, Lee (2009) also joined the criticism arguing that the fiscal policy rules[13] were violated and monetary policy effectiveness was undermined by financial market volatility and economic instability. Though arguments by the latter lack empirical evidence, this study would view them in the light of comprehensive empirical framework, the financial sector's performance and scope for policies interaction in this context.

Among prominent critics of monetary and fiscal policies' performance in the UK, Henry (2001) argued that the present framework of macroeconomic policies does not work well in the case of adverse shocks to the economy. Fiscal policy had been loosed which has caused the monetary policy to adopt a tight stance to control inflation. Policy framework has caused the appreciation in exchange rates which have resulted in worsening of current account balance. Furthermore, the stability of inflation was associated with international outlook and if the world inflation gets worse, the UK would be strongly affected. It was also suggested that there is need of a council of economic advisors which can analyse the fiscal stance and publish its appraisals. Though the conclusion was not supported by empirical evidences, arguments were quite logical. Analogously, later study by Angeriz and Arestis (2007) criticized tight monetary policy; they concluded that inflation targeting has been successful in the context of HM treasury target level and inflation had been "locked in". Yet, the inflation had also been low in a non-inflation targeting country like the USA. Furthermore, they also declared globalization as a cause of low inflation, instead of monetary policy success.

Macroeconomic policies also have political implications in this context; Lee (2009) criticizing the government argued that the UK economy had started moving towards recession before the financial

crises. Moreover, the claim of monetary policy effectiveness was undermined by the financial market and economic volatility. Although the arguments made by Lee (2009) lacked empirical support, the behaviour of financial markets depicted in Figure 3 provides support to these arguments. The London Stock Exchange (LSE) showed frequent hideous episodes of sharp decline from the last quarter of 2008 till the first quarter 2009.

The Green line represents Quarterly, Blue line represents the daily, while Red line represents monthly averages of FTSE-100 index. It took market several quarters with very volatile behaviour to return close to the pre-crises level. As seen in Figure 5, the stock market started slow recovery at the end of the first quarter in 2009, almost the same time when the BoE carried out Quantitative Easing (QE) and Asset purchases.

Nevertheless, the bond market has also responded to the financial crises and macroeconomic policy responses as we can evidence in Figure 6.

There is negative yield on 10-year Gilts, a clear representation of expansionary monetary policy and Quantitative Easing (QE) which have suppressed the yield on gilts. It implies that although the government could borrow at negative real interest rates, saving household would get negative real returns.

Coming back towards the theoretical arguments, Lee (2009) declared that the British model of competitive policy failed as fiscal policy's Golden rule (borrow to invest public investment not consumption) and sustainable investment rule (Debt-to-GDP 40%) were violated. Importantly, the

Figure 5. FTSE 100 (July 2007 to July 2012).

Note: 90 Days Moving Avg (green line), 30 Days Moving Avg (red line), and Daily Avg (blue line).
Source: London Stock Exchange.

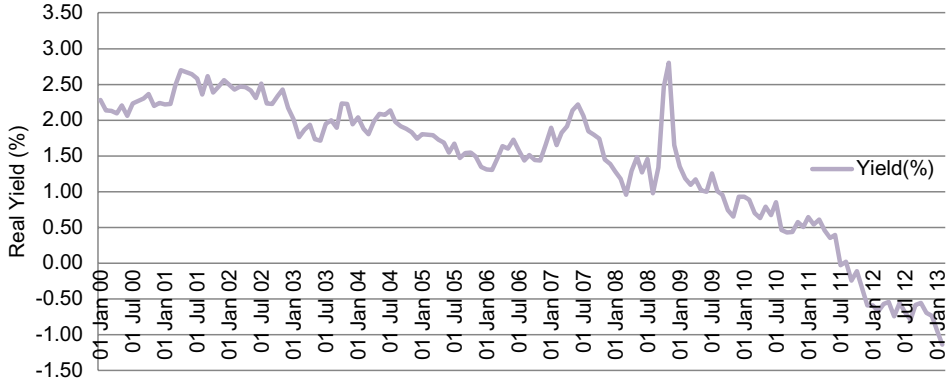
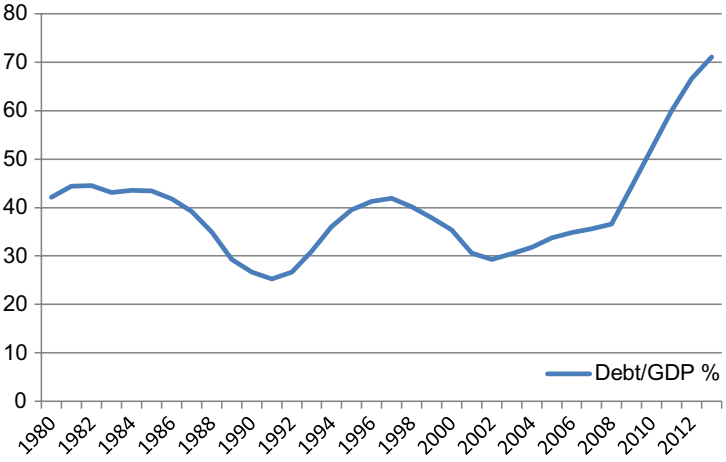


Figure 6. Real yield on 10-year Gilts, January 2000–February 2013.

Source: Bank of England (2012).

Figure 7. UK sovereign debt in comparison with income.

Source: Office of National Statistics (2012).



crucial aspect was risk-based financial regulation which caused the economy to be badly hurt during financial crises, although the blame had been put on the American subprime mortgage market for a year. Similarly, a study on stabilization of business cycle volatility as a key motive of economic policies in the UK, Atanasova and Gang (2008) declared that there was no significant evidence on declined business cycle volatility. Arguments by Lee (2009) lacked empirical support as no statistical method was used; however, the aforementioned outlook of the financial sector and below-cited fiscal situation prominent in Figure 7 support their arguments.

This study aims to provide empirical evidence to argument and make concluding remarks without any political context. In the next few sections, we will review some studies on the role of macroeconomic policies and their interaction.

10. Monetary policy role

The role of monetary policy has been very significant for the UK economy; in this context, a study by Beladi and Samanta (1988) is worth mentioning. They analysed the relation between money growth and output growth in the light of Rational Expectation Structural Neutrality (RESN) hypothesis, which emphasizes that the only unanticipated money growth affects economic activity. Interestingly, empirical findings did not support RESN hypothesis which has the implication that monetary policy effective in the UK, whether it is anticipated or unanticipated by market participants.

In practice, the response of stock and bond markets to monetary policy in the UK is acknowledged by the Bank of England (2011), stating that the bonds and equities are inversely related to monetary policy (interest rates) due to the high rates on which future income is discounted. In the macroeconomic policy literature, Bredin el al. (2005) showed that the contractionary monetary policy leads to a negative response in various sectors of the stock market. More recently, Gregoriou, Kontonikas, MacDonald, and Montagnoli (2009) also showed that stock market response to contractionary monetary policies is negative, which has become positive during the credit crisis. "They associated it with limitation of monetary policy, i.e. further rate cuts; this situation provides rationale to bring in fiscal policy which is the premise of this study."

In the light of the literature reviewed so far, it has been observed that there has not been substantial research performed on the interaction of economic policies, in particular to UK's economic and financial environments. Yet, there are a few studies which we could acknowledge. Interesting, in the context of financial sector, Kontonikas and Montagnoli (2006) urged that due to wealth effects and inefficiency of markets, responses of asset prices should be incorporated in monetary policy formulation. However, it is not part of practise so far. In addition, Allen and Yang (2004) found that apart from the dividend growth and monetary policy, the stock prices are also affected by un-explained

innovation. There was no further investigation to analyse the unexplained innovation which might be due to several factors including fiscal policy.

11. Fiscal policy role

In specific to subject economy, the role of contractionary fiscal policy was investigated by Barrell and Riley (2004). Their simulation and empirical analysis showed that the economy seems imbalanced; however, a fiscal contraction (spending) without increase in taxes would affect exchange rate (depreciation) markets and money markets (lower interest rates). In contrast, if there had been fiscal expansion (spending) accompanied by the increases in taxes, the effectiveness of fiscal policy decreases. Their analysis prominently supported the limited role of fiscal policy; however, it was contrary to Keynesian philosophy of active fiscal responses when the economy is in recession and financial volatility. Earlier to them, a similar study by Alec Chrystal and Dowd (1989) performed in the light of various economic schools of thoughts showed that contrary to Keynesian ideology, the fiscal expansion had negative impacts on economy output. Their results support the Real Business Cycle theory. On the other hand, a quite interesting and recent study by Creel, Monperrus-Veroni, and Saraceno (2009) found that the New Classical Macroeconomic framework which opposes the Keynesian idea of active fiscal policy has illuminated the importance of fiscal policy. They argued that the fiscal policy may dominate the monetary policy without having any negative influence on economic stability. Moreover, the effectiveness of Fiscal policy (Keynesian Multiplier) has been increased over time in France and the UK. They also considered it disappointing that even the accepted importance of fiscal policy central bank dominance, rules and fiscal constraints has not changed. Their arguments received further support by an investigation made by Malley, Philippopoulos, and Woitek (2009), who showed that the dependence of counter cyclical fiscal policy on output and debt dynamics causes indeterminacy, whereas under counter cyclical fiscal policy, welfare gains were greater. Therefore, they recommended active counter cyclical fiscal policy in countries like the UK. Nevertheless, a study by Kirsanova, Stehn, and Vines (2005) concluded that best outcome is achieved when both fiscal and monetary policies perform together, which is also the theme of this study.

12. Macroeconomic policy interaction in the UK

An extensive review of literature on macroeconomic policies shows that the monetary–fiscal policy interaction, even their joint analysis, had not been popular, in particular to the UK economic environment; perhaps it has been more popular in the EMU. Pointing out this fact, Semmler and Zhang (2003) associated a whole aspect of existing macroeconomic policy interaction literature to EMU, declaring it crucial for Euro economy.

Among very rare studies from the UK which jointly considered the role of monetary and fiscal policies, an investigation by Kirsanova et al. (2005) which was limited to a theoretical framework (no empirical validation) argued that the best outcome is achieved when macroeconomic policies are cooperative and monetary policy perform actively for economic stabilization (inflation, output and debt). Results were consistent when fiscal policy performs actively, acknowledging monetary policy does not play Nash (non-cooperatively). In their theoretical framework, they only acknowledged behaviour of the output and inflation under macroeconomic policy interaction and did not perform any empirical analysis. Moreover, the financial sector could not gain any attention. Later study by Creel et al. (2009) showed that the fiscal policy may dominate monetary policy without having any negative influence on economic stability. Nevertheless, they only focused on the role of fiscal policy and little insight was given into the monetary policy behaviour; moreover, no optimal combination of policies was suggested either.

The implications for monetary–fiscal interaction for economic stabilization in a rather recent study were investigated by Blake and Kirsanova (2011). They showed that in case when there is conservative monetary authority, the strategic action by fiscal authority could lead to welfare losses; interestingly, they gave a notion that having two policy-makers could lead to conflict and stabilization bias. They argued that the strategic behaviour of fiscal authority may have costs which should also be

considered. Moreover, the monetary policy should also support if there is high debt. In a non-cooperative scenario, the Nash leads to high volatility. The main conclusion of their comprehensive analysis was the coordination between policies. Yet, most importantly, recent study by Fragetta and Kirsanova (2010) showed that in the UK, macroeconomic policies act in non-cooperative manner. Although they did not mention the cause of non-cooperation and recommendation for cooperation, their findings are distressing as the poor financial and economic scenarios could be attributed to non-cooperation between macroeconomic policies.

13. Institutional changes in policy framework

An important aspect of this study is the state dependency of optimal policy combination. In this regard, there have been a few remarkable changes in the intuitional arrangements of macroeconomic policy framework in the last few decades. Significant among them are withdrawal from Exchange Rate Mechanism (1992), independence of the BoE and formulation of MPC (1997), inflation targeting (1992 and 2003) and Fiscal Responsibility Act (2010). Although, it would be quite interesting to see the implications of all the institutional changes for optimal policy combination, the most important and interesting change in the context of this study might be independence of the BoE in 1997. Apparently, it is just giving autonomy to monetary authority with the intention that it could focus on its prime object of price stability. Nevertheless, there were some vital responsibilities related to financial stability, which were transferred from the Bank of England to other institutions. "The most important are: (1) the supervision of the banking sector was transferred to Financial Services Authority (FSA) and (2) the responsibility to stabilize sovereign was debt transferred to Debt Management Office (DMO)." These are major shifts in responsibilities and authorities from the BoE to FSA and DMO. Perceptibly, the rationale of these arrangements would be to increase the efficiency of policy formulation; however, these changes may have important implications for UK's financial sector and economy as we have provided some evidence on other economics earlier.

Among the studies which analysed the impact of intuitional changes in macroeconomic policy framework in the UK, Haldane and Read (2000) investigated the role of monetary policy under the influence of inflation targeting and its effects on the bond market (yield curve). They found that introduction of inflation targeting in the UK has significantly decreased the effects of monetary policy surprises on yield curve. They associated it with the increased transparency of monetary policy due to inflation targeting. Yet, we are seeing this shift in association with the addition of interaction with fiscal policy. Institutional design of macroeconomic policy in the UK was praised by Bhundia and Donnell (2002) who argued that independence of central bank in the UK and institutional arrangements are based on the principles of credibility, flexibility and democratic legitimacy. Therefore, the independence of the BoE has not only increased the effectiveness of monetary policy, it has increased the fiscal coordination. Their arguments were logical but there was no empirical evidence.

Analysing institutional changes, Osborn and Sensier (2009) found that the there was strong evidence of a structural break coinciding with the introduction of inflation targeting. They declared the inflation targeting as a more important change than the independence of the BoE. Similarly, Lildholdt and Wetherilt (2004) concluded that the ability of market participants to predict monetary policy stance by the BoE has been improved. Later, analysing economic and structural changes in the UK economy (output, inflation and Forex) under different monetary regimes, Liu and Mumtaz (2010) found that there had been a shift in response of monetary policy from economic growth and exchange rates (1975s) to inflation at present. They also acknowledged that economic fluctuation was less frequent after 1992 until recent past, though they did not associate it with any institutional aspect. The subject study would see their assertions in the light of comprehensive and alternative empirical frameworks and its implications for the financial sector.

14. Macroeconomic events and shift in policy effectiveness

The second context of state dependency in which we analyse the impact of optimal policy combination is the major macroeconomic event and resulting shift in policy effects. In specific to subject economy and the financial sector, we have three major events in the last two decades which include

the Collapse of Exchange Rate Mechanism (ERM), Dotcom bubble or Stock Exchange Crash of (2002) and earlier acknowledged Global Financial Crises and Lehman Brother's bankruptcy (2008) which severely hit global as well as the British stock market. It must be acknowledged here not many studies have considered the implications of these events on macroeconomic policy role, particularly in subject economy. Nevertheless, we have some evidence on this aspect; a study by Gregoriou et al. (2009) analysed the influence of stock exchange crash on monetary policy effectiveness. A structural break was found in between contractionary monetary policy and stock market relationship which changed from negative to positive in the post-financial crisis (2008) period. "They associated it with limitation of monetary policy, i.e. further rate cuts; this situation provides rationale to bring in the fiscal policy which is the premise of this study." They also declared their study as the first to consider the shift in monetary policy and stock relationship in the light of financial crises (2008). However, there are two major aspects we must consider: (1) as cited earlier, the monetary policy, particularly interest rate instrument in Britain, is in the Liquidity Trap since March 2009; (2) in the light of enormous arguments in favour of joint policy analysis, it is vital to consider fiscal policy as well. Therefore, in subject study, we are considering both policies and in context of major economic events, it would be helpful to understand which policy instrument is more useful and how to optimally combine them for financial stability.

15. Alternative empirical frameworks

Macroeconomic policy literature shows that either GE modelling or Econometrics techniques have been used for empirical analysis. Acknowledging this fact, Bhattarai (2011) urged that the DSGE and Econometrics should be considered complementary techniques rather than competitive. In Econometrics framework, structural parameters are estimated from time series data to make forecasts about the impact of economic policies; however, the Econometric models do not focus enough on the optimization behaviour of household and firm. This deficiency can be complimented by DSGE framework which generates time series on which forecasts of Econometrics analysis can be assessed. The idea of using both frameworks in this study is also supported by comprehensive analysis of Consolo et al. (2009) as they concluded that the combination of DSGE model and FAVAR (Econometric) dominates other frameworks. Nevertheless, we are suggesting alternative frameworks as well as alternative empirical approaches, i.e. Frequentist and Bayesians, in addition to a brief account in introductory section. On the ability of empirical methods to lead to a meaningful conclusion, Chari (2010, p. 1) made very concise and remarkable comments that "the models are purposeful simplifications that serve as guides to the real world; they are not the real world". Thus, in effort to reach to the best estimation and simulation of our optimal policy combination, subject study is considering both empirical framework and approaches. Though this element makes this study prominent from the previous research acknowledged in above lines, in particular to the UK, there is no evidence of this strategy in the subject area of research.

16. Conclusions

In specific to the, under analysis, UK, the macroeconomic policy interaction has not been very popular among researchers; perhaps, much of the space being given to the EMU. The financial sector of the UK also has great significance and contribution towards the economy and national income. Since financial crises (2008–2009), the financial markets, particularly bond and stock markets, have been very volatile; perhaps, the high volatility of the financial sector was the basic factor resulting in the formulation of the FPC by the Bank of England. Hence, on the academic and research side, it requires having deep insight into the role of macroeconomic policies and their interaction for the financial sector of the UK.

Moreover, there have been substantial intentional arrangements made into the macroeconomic policy framework in the last few years. The last two decades have also seen extraordinary major macroeconomic and financial events. It would also be interesting to analyse the implications of these institutional changes and events for optimal macroeconomic policy combination and their effectiveness for financial stability. Most of the studies on macroeconomic policy analysis have been focused on either Econometric or General Equilibrium framework or Bayesians or Frequentist

approach; both approaches have their own advantages and limitations. This study has provided an exhaustive discussion in the context of existing paradigm and evidence on the subject and concomitantly suggested to consider an alternative empirical framework for the robustness and validity of empirical results.

It would be appropriate to acknowledge the limitations of this study as it would also point us towards the potential venues of future research. At first, we acknowledge here that the scope of subject study has been limited to stock and bond markets due to a limited time horizon. However, the future possible extensions could be made to include other aspects of the financial sector, for instance, foreign exchange markets, money markets and even derivative markets would be interesting additions. Secondly, we can also extend this study to a scenario where monetary policy is in the liquidity trap; however, considering the limited time horizon, we abstained from going further in this direction. Thirdly, on empirical and methodological grounds, the theoretical framework we have developed and the critical reasoning we have documented require an empirical validation. Fourth and last limitation of this study is related to the particular macroeconomic policy and financial sector environment of the UK on which we have been focusing on. Considering the fact that the British macroeconomic policy intuitions and financial sector are both the most established and ancient in the world, as cited in the introduction, the market capitalization as share of national income is the highest in the world. Hence, the conclusions and recommendations may not be equally applicable and should be taken with a grain of salt when applied to any other economy, particularly to developing economies. This aspect also provides the rationale for the future research.

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Notes

1. Bank stats (Monetary & Financial Statistics) are official symbols and abbreviations http://www.bankofengland.co.uk/statistics/ms/symbols.htm.
2. The part of the economy that is concerned with actual production of goods and services.
3. This refers to the period before the current financial and economic crises that started in 2008.
4. According to Foot (2003), there is no particular definition of financial stability; however, it could be defined in the context of financial assets price volatility (details in next sections).
5. In the current economic scenario, interest rates in many major economies cannot be cut any much further, e.g. in the UK, the current interest rate is 0.5, in the US 0 -0.25 and in the Euro zone 0.25%.
6. The Ricardian Equivalence refers to idea that any effort by the government to stimulate economy by debt-financed spending would be counter by the increased household savings to pay the higher taxes in future.
7. (a) Expansionary Fiscal– Expansionary Monetary, (b) Expansionary Fiscal–Contractionary Monetary, (c) Contractionary Fiscal–Contractionary Monetary and (d) Contractionary Fiscal–Expansionary Monetary.
8. An economic state where resources are allocated in the most efficient manner.
9. Banks and building societies were allowed to swap their high-quality mortgage-backed and other securities for UK Treasury Bills for up to three years.
10. Headed by Governor of the Bank of England, this committee would monitor the UK financial sector and its effects on the economy. http://www.bankofengland.co.uk/publications/news/2011/041.htm
11. Mishkin (2011) and Niemann and Pichler (2011) the optimal combination can be defined as "stance of Monetary & Fiscal policy which leads to simultaneous positive response from Stock & Bond markets".
12. In the light of the Fiscal theory of price level (FTPL), a non-Ricardian scenario exists where fiscal policy has deterministic effects on price stability (Moreira, Soares, Sachsida, & Loureiro, 2011).
13. Fiscal policy's golden rule (borrow to invest) and sustainable investment rule (Debt-to-GDP 40%) were violated.

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